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**NEWS IN BRIEF**

**Star role for ICL's DAP**

AN ICL Distributed Array Processor will form part of a Science Research Council network processing astronomical data, if the current DAP trials at London University's Queen Mary College are successful.

The SRC is setting up the network, called Starlink, using six Digital Equipment VAX 11/780s which will provide 60% of UK astronomers with a machine at their own sites.

**NEDO raps govt**

KOREANS and Japanese production costs for electronic consumer goods are consistently lower than in the UK, according to a report commissioned by the Consumer Electronics Sector Working Party of the National Economic Development Council. It criticises the government for consistently failing at EEC level to discourage West Germany and the Irish Republic from diverting Far East-made consumer goods into the UK market.

**250th system**

HONEYWELL's Newhouse factory in Luton has shipped its 250th large-scale computer. The system, a Level 66/DPS-4, has gone to the London Borough of Croydon. Honeywell said all 250 machines had been delivered exactly to schedule, some overseas.

**WP division**

PERSONNEL group Drake International has set up a word processing division to provide training, consultancy, and a bureau service. Temporary or permanent WP operators will also be supplied by the new firm, Drake International Systems.

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# COMPUTER WEEKLY

## Bill on NEB cutbacks goes stage further

GOVERNMENT plans to cut back on the activities of the National Enterprise Board moved forward last week when the report stage of the Industry Bill was completed in the Commons.

An amendment moved by Opposition chief Industry spokesman John Silkin, which aimed to reject a clause that would stop the NEB becoming involved in any industrial reorganisation, was lost, but a government amendment reducing the board's borrowing limit from £3,000 million to £750 million was accepted.

For the Opposition, Silkin said that the taxpayer had a right to share in profitable transactions as well as the "casualty clearing" activities to which the NEB would in future be confined.

However, Industry Minister Sir Keith Joseph said the board would still have a valuable catalytic role to play in high technology and some other areas.

The Minister may have been referring to such ventures as the Inmos microelectronics project, but this is still awaiting the Minister's decision on the payment of its second £25 million funding.

A DoI spokesman said a review of Inmos was still going on and it would be a few weeks before this was completed. Pressed to define "a few weeks," he said the decision was likely "in weeks rather than months."

Meanwhile Sir Keith is understood to have accepted to a plea from NEB chairman Sir Arthur Knight that the board's assets should not be sold as quickly as had been demanded by the Chancellor in his last Budget.

So far, only the shareholding in ICL has been sold, for £38 million (CW, December 20/27, 1979), and Sir Arthur was concerned about the effect of selling other holdings while the stock market was depressed.

## DP industry leaders in Brussels summit

TOP executives of eight major European computer and telecommunications companies met in Brussels last Friday to discuss a strategy for capturing a bigger share of the world information technology market.

Among those at the meeting, which was considering a report by EEC Industry Commissioner Vicomte Etienne Davignon, were Philip Chappell and Dr Chris Wilson, chairman and managing director respectively of ICL.

The Brussels meeting was a follow-up to the presentation of Vicomte Davignon's plan to EEC heads of state at the Dublin summit last year.

The other main UK representative was Des Pitcher, managing director of Plessey Telecommunications and Office Systems. The other companies represented were CEG/Thomson and CII-Honeywell Bull of France, Siemens and Olivetti from West Germany, Olivetti from Italy and Philips of the Netherlands.

The report, called European Society Faced with the Challenge of New Information Technologies - a Community Response, looks at the potential for data processing, microelectronics and telecommunications products. It outlines the strategies which European manufacturers could adopt to capture up to a third of the world market for these products by 1990.

Major issues include the replacement of existing national preference policies with some form of EEC-wide preference, at present an area of conflict and controversy. ICL, for example, wants preference to be given to purely EEC-based firms. Standards are another important issue.

However, it appears that the talks last Friday did not attempt to thrash out any solutions to these problems. A second meeting has been lined up for the end of March and among those expected to attend is Philip Chappell.

## US action over standards fails

FOUR US computer manufacturers have failed in their court action to prevent the US government's Commerce Department adopting the IBM 360 and 370 channel interface as the input and output standard for mainframes installed by government departments.

Burroughs, Control Data, Honeywell and Univac had brought a joint action in an attempt to block the implementation of the standard (CW, January 10).

The companies argued that the use of the standard was a backwards step because the IBM channel protocol imposed an overhead which effectively limited data transfer rates to about 1.5 megabytes a second.

They also felt the imposition of the standard would prevent them from competing in a market worth an estimated \$470 million a year and would favour Japanese manufacturers, which used one of the standards.

The four companies challenged the Commerce Department's authority to implement the standards, arguing that it needed the stamp of the President.

The Commerce Department agreed that the introduction of the standards would increase competition in the peripherals market at the expense of large manufacturers. But it said the move would save the government \$80 million a year.

Federal Judge John Penn ruled that the four manufacturers had no legal grounds for challenging the Commerce Department's authority and dismissed their action.

## US firm aims high

From front page

tion in the UK non-Post Office market as a short-term goal and Rascal from the No1 slot in the longer term. Linnell says the company's integrated approach enables it to build the largest product line in the industry, more than 200 products, with the smallest component stock - containing only 2,000 types.

Founder and president Chuck Johnson says the key to success in this market is to have products with a three-year life cycle. Johnson founded the company in the US in 1969, one year after AT&T's monopoly on attachment to the telephone network was broken, and he predicts that the data communications equipment suppliers will be unable to saturate the market before world population growth stabilises. The world market is \$300 million a year and growing at 25% a year, he says.

The UK market is £50 million, half of which is free or non-Post Office, and recent Post Office policy changes towards outside purchasing are encouraging, in Johnson's view.

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# COMPUTER WEEKLY

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## PRC backs out of Gamma takeover

THE Gamma Group has hurriedly been negotiating with other prospective purchasers this week following a last minute decision by PRC International, the UK subsidiary of Planning Research Corp of Washington DC, not to go ahead with its takeover of the ailing Nottingham-based systems house.

PRC gave no reason for its decision except to say that it was made last week after PRC received detailed information from Gamma about its financial condition. PRC emphasised that its decision was not affected by the 2% of Gamma shareholders reported to have been reluctant to sell their shares.

On Monday, Gamma managing director Dr George Coggan said that negotiations with other prospective purchasers would have to be taken up again very quickly. They were terminated on December 21 when talks started with PRC.

At the end of January, PRC said it was prepared to pay £500,000 for Gamma, an amount that would have had to pay for all Gamma's shares and cover the company's substantial debts. Last November several major financial institutions spent £200,000 on Gamma shares and another £200,000 worth of loans was raised. At the same time Gamma laid off 16 staff (CW, November 8, 1979).

**CDC deal with Russia in peril**

THE agreement signed in December between Control Data and the Soviet foreign trade organisation, Licensintorg, could be in jeopardy if the Soviets decide to impose their own export ban as a reaction to the US government's current export freeze.

Under the agreement CDC is to market Soviet technology in the US in order to raise badly needed dollars for the USSR. The Soviets will use the money to pay for CDC computers and other US products.

The 25 Soviet technologies involved are energy related, and considered to be in advance of the West. The most significant is Magneto Hydro Dynamics, the means by which an electrical current is generated directly by passing the combustion gases of a fossil fuel through a magnetic field.

A CDC spokesman in Minneapolis told Computer Weekly that the company would know for certain if the deal was still going ahead later this month when CDC personnel visit the USSR. He added that CDC has heard nothing "negative" from the Soviets yet about the agreement, and that letters were still being exchanged on the details of the project.

## Briefing Sanders buys Calcomp

SANDERS' takeover bid for Calcomp was finally approved last week when shareholders of both companies voted decisively for the merger. Calcomp shareholders will get 0.34 Sanders shares for each Calcomp share. The offer valued Calcomp's shares at \$13.50 when it was first made but because of stock market fluctuations the offer is now worth more.

Sanders has been out of Europe since it sold its Data Systems Division to Harris (CW, February 17, 1977) but Calcomp is strong on this side of the Atlantic. Calcomp's International Division says the merger can mean nothing but good.

Initial opposition to the merger by Calcomp founder Lester Kilpatrick (CW, November 8, 1979) was withdrawn earlier this month.

**Prestel limit**

HALF of the 300 adapted television sets for the Prestel international market trial have been ordered from Sony UK and the others will come from Electronic Rentals, a subsidiary of Decca. The Post Office said it decided to limit the number of suppliers to two since the trial was spread over seven countries. Only six of the 28 companies asked were interested.

**Schools contest**

A COMPETITION for schools, with computers as prizes, is being considered by the Departments of Industry and Education and Science as part of the drive to promote computer education.

**AS/7031 relaunch**

NATIONAL Advanced Systems in Europe has formally announced the AS/5000, its more powerful and less expensive alternative to the IBM 3031. This is effectively a relaunch of the machine that was sold by Intel as the AS/7031 before its Advanced System marketing operation was taken over by National last year.

**Hanover trips**

TRIPS to one of Europe's leading computer industry events, the Hanover Fair in April, are being arranged by Commercial Trade Travel and IPC Electrical-Electronic Press, publishers of Computer Weekly. Visitors can have four nights at a top hotel from April 15 or 18. The price for the hotel and return air travel from Heathrow is £240. Further information from Commercial Trade Travel at Carlisle House, 8, Southampton Row, London WC1.

**NOR chairman**

THE position of chairman and managing director of NOR (UK) has been taken up by Rex Fleet, managing director of the company since 1976, following the retirement of Clark E. Reynolds. Reynolds will now concentrate on his other responsibilities as vice-president, Europe for NCR Corp.



ANDERSON... "The pressures to share expertise will increase sharply"

## Third World is key to prosperity—NCR chief

THE successful international companies in the 1980s will be those which are willing and able to transfer usable technologies to poorer nations. But those companies will face increasing competition in their overseas — and home — markets as emerging industries in developing countries gain strength.

So said William Anderson, chairman of NCR, in a speech to the American Chamber of Commerce in London last week.

"The pressures to share expertise — often on a giveaway basis — will increase sharply," he said. "This problem is compounded by the fact that in many industries technology is moving so rapidly that by the time it is transferred to another country it is already outdated..."

Those organisations that demonstrate the capacity for transferring usable, long-life technology will not lack markets for that technology.

Not every country could develop and make computers, said Anderson, but most could learn to use them and develop management skills. That, too, was technology transfer.

On the growing competition from developing countries, Anderson said 25% of manufacturing in the world would be done by developing countries in 20 years' time. The UK, the US and Germany would be hit, he said, adding, "We must accept the probability that many of our labour-intensive industries will be moving to lower-cost locations around the world."

This prospect always fuelled the fires of protectionism, said Anderson, but protectionism was "a quick remedy for curing an economic illness".

Other principles for commercial success in the 1980s included a concentration on a single type of product rather than a diversification into many markets.

Companies should give local autonomy to subsidiaries overseas, said Anderson. And the intellectual resources of many countries, not just those of the headquarters country, should be used. Many US multinational companies had not come to grips with this. But the UK and Europe were well ahead of the US in, for example, electronic funds transfer.

## TA moves into home computer business

THE personal computer business will see the arrival of a major force in May when the West German business systems manufacturer Triumph-Adler, backed by Volkswagen, launches a £450 system aimed at the home and schools markets.

And later this year Triumph-Adler plans to diversify further from stand-alone business computers into distributed processing systems.

This expansion into new markets is the first sign of the effect Volkswagen's backing is having on the company. Triumph-Adler says Volkswagen's investment has enabled it to bring forward the date for the introduction of these new products. That investment has just been increased from 53 to 72.9% through the purchase of the remaining shares held by the US firm Litton Industries.

Triumph-Adler's personal computer, based on the Intel 8085 microprocessor, will be called the Alphatronic. The £450 version will have 12K bytes of read-only memory, 4K of random access memory, a cassette unit and a television interface. The television being the system's display unit.

A 16K version with two 128K minidisks will cost £700. The biggest machine, with 48K of memory, two minidisks and a printer will cost £2,400. A printer using silver oxide paper and running at 2,300 characters a second will also be available.

The Alphatronic will run Basic, but no business packages will be provided as Triumph-Adler says its existing 1100 range is for the business market. A new model, the 1100C, which

## IBM profit surges ahead in UK

IBM recorded a 24% net profit increase and a 16% rise in turnover in the UK last year. These results compare favourably with the company's overall performance: worldwide profit fell by 3% and turnover increased by less than 9%.

The turnover of the UK company was £882 million. Almost half that figure, £433 million, came from business outside the UK. Exports formed the fastest-growing part of the UK company's business: the figure was up 30% on 1978. Sales and rentals to UK customers rose only 6% to £448 million.

Profit after tax was £102 million.

**System 34 Basic**

IBM has announced Basic for its System 34 business computer. The language will be available in March at a monthly licence fee of £24.40. The other languages available on System 34 are RPG II £17.80 a month, Cobol £52.30 a month, Assembler £52.70 a month and Fortran IV £70.40 a month.

## Receiver goes in at Gamma

THE Gamma consultancy, systems house and bureau group went into receivership on Wednesday of last week following the decision by PRC International, UK subsidiary of Planning Research Washington, not to go ahead with its acquisition of the financially crippled Nottingham systems house (CW, February 14).

In an attempt to save the company at the eleventh hour Gamma directors had exploratory talks with International Aeradio last week to see if IAL would make an offer for Gamma. But the discussions, according to an IAL statement, were "unsuccessfully concluded".

The receiver was appointed by the Midland Bank and one asset he could salvage from the wreckage of Gamma is its bureau operation at Nottingham. The bureau is based on dual Digital Equipment PDP.

11/70s and employs more than 30 people out of Gamma's workforce of around 120.

The other main Gamma centre affected by the crash is at Wokingham, Berks.

The Manchester software house that Gamma took a share in last year and renamed Gamma Fars (CW, August 30, 1979) is still very much in business. Its principals are buying

## President 'unlocks' Euronet

THE EEC's packet switched network, Euronet, was officially made available to its users last week, when the President of the European Parliament, Simone Veil, accepted a symbolic key to the network from the President of the European Commission, Roy Jenkins, and made an inaugural address to the network at a terminal in the Palais de l'Europe in Strasbourg.

The Diane information service available on Euronet so far has 11 host computers connected, and some users have been able to access them since November. But the service is not having a full launch in all nine countries at this stage because the billing software is not yet fully operational and not many ports are available on some network nodes.

Denmark and Ireland both launched the service on the home market last week. Italy plans to launch it next week and Germany the week after. Luxembourg plans a launch on March 15 but France, Holland, Belgium and the UK have not yet set dates.

Sweden and Spain are negotiating to join Euronet and Switzerland has recently been accepted as a member.

Producing a dictionary of terms used in the Euronet project has enabled Logica and SESA to standardise on their use of terms and abbreviations. The dictionary was prepared by Technical Translation International in London to enable them to translate 6,000 pages of technical manuals from French into English for Logica.

**INSIDE THIS WEEK'S CW...**

<b>THE 4300 EXPOSED</b>	<b>ALSO...</b>
In this month's Marketview Fred Leland looks at the strengths and weaknesses of IBM's 4300 as a distributed processing system. Pages 14/16	Computerview on Inmos Letters to the Editor ICL chip problems Michie's Privatview Focus on emancipation Fibre optics report Page 5 for programmers Software File on copyright Dr Spol Info service for IBM users People and Events Micro News The 80 report Computer News Product Notes Advanced file design Book reviews Expert systems Working on contract The Sales Bit
<b>NEVER FEAR</b>	
Is the programmer dead? This is the question being asked in the computer industry with the advent of cheaper hardware and so-called English-language inquiry systems. But Nicholas Enkinap has been doing some research into the question and has come up with results which suggest the programmer has nothing to fear — yet. Page 23	
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**JOB OPPORTUNITIES: PAGES 24-25**

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dispute, too, dragged on and was settled out of court.

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## Downtime

Here be dragons  
—forbidden

FURTHER to my tirade against baffling wordless signs (Downtime, January 24), cast your peepers over the photograph above. It is a sign at one of the entrances to the newly-opened Hong Kong Metro, and is clearly another shot in the war by bureaucrats who are simply trying to stop people from doing things. But what does it mean?

I suppose the two centre symbols are part of the Hong Kong campaign to suppress the onslaught of American junk food, in favour of nutritious, ethnically sound Chow-mien. Good for them for fighting off this cultural aggression! But what on earth is the sign on the bottom right? For that matter it looks distinctly extraterrestrial to me.

Does it mean "No dragons disguised as burglars may travel on the train"? I know administrators have to foresee

## Hello, LA...

THERE seems to be no limit to the lengths Americans will go in slaughtering our glorious language. I tried to ring up someone in Los Angeles the other day and after some clicking I heard a sweet Californian voice utter the following:

"This is recording number 4121C4. The number you have reached is not operative for international service."

Just as well. I was not trying to get Victoria de los Angeles!

## MICHIE'S PRIVATEVIEW

Barking up  
the Tree  
of Knowledge

AN industry is arising from the machine representation and exploitation of useful knowledge. "Knowledge engineering" involves not only new technology but also on how we, the "machines made of meat" (to use Marvin Minsky's ghastly phrase) organise our own processes and catalogues of knowledge within the skull.

One might suppose that such impact would be welcome. Yes and no. Among persons professionally skilled at using their brains there are camps and rivalries at least as violent as, say, the Electricity Council's and the Gas Board's contempt for each other's products. We can well imagine the suspicion with which Thermal Science would be viewed by both parties if its calculations showed that only by certain judicious integrations of gas and electricity could domestic heating systems be made really effective.

In the world of the intellect the People of Gas are the practitioners: lawyers, doctors, architects, engineers, economic geologists. At a more rarefied level we encounter applied mathematicians of various kinds — statisticians, operations analysts, software technologists, aero-designers and others. Humble representatives are mechanics, welders, boat-builders, dressmakers, cooks.

The People of Electricity hold sway as the patrons of intellectual life. Their role is to conserve, propagate and improve society's treasures of descriptive truth. Although dedicated to the proposition that Electricity comes from the skies and needs no justification, Electric people have always been shrewd enough to sell their surplus sparks to Gas people in trouble with ignition. Thus a biologist can draw pay from a medical school. A social philosopher can earn a penny helping to prepare budding lawyers. Behind the engineer stands the physicist; behind the space pilot, the astronomer. And so it goes.

So what could be more idyllic than this Eden, in which Electric Adam needs his Gaseous Eve, and vice versa?

Enter the Serpent. Computation, insinuating that a Tree of Knowledge can be grown without undue cost. But which kind of Knowledge? Here the real trouble begins.

To Electric Man, true knowledge is constituted solely of the theorems and facts which define The Way Things Are, immutable.

ably. The rest is for tradesmen, troglodytes, and the B-stream. Gas people, however, know full well that with a bundle of heuristic amazing operational successes can be put together. The bundle may be mere "know-how", but what can you do with an academic theory? Is a chess-master strengthened by a course in the theory of games, or a racing cyclist by mastering Newton's dynamics?

So it has always been, a deadlock. But suddenly the deadlock matters.

In the first flush of achieving expert systems to diagnose meningitis more reliably than a doctor, or to spot potential uranium sites more shrewdly than a geologist, or to guide structural engineers through a forest of numerical methods, knowledge engineers have sometimes failed to see that a

brick wall looms ahead. What sort of causal model of meningitis does Stanford's Mycin have? How much scientific geology does SRI International's Prospector understand? There are two particular circumstances in which these questions begin to bite:

1. The machine system may hit a case not covered by its stored catalogue of pattern-based rules. It runs out of "know-how". If only it could now summon up a deeper, more academic theory, from which to infer a way of patching the gap.

2. The client's demand for real-time explanations of the program's decisions may become too probing. A causal model of the task-domain is now needed, something less shallow than the program's stock of quick tricks and heuristic rules. The distinction between the

UMBRELLA TABLE

Condition	Action
soaked outside	do-not-open
—	go-to WEATHER
—	do-not-open

WEATHER TABLE

Condition	Action
raining	open
hailing	open
snowing	open
—	do-not-open

Tables 1 and 2: When to open an umbrella, using heuristic decision tables.

## FOCUS

on emancipation

CHAUVINISTIC DP managers had better look to their laurels. Signs are that the 1980s could well see the arrival on the installation scene of competitive forces. This competition is scheduled to arrive in a ready-made software package, thereby presenting an even more unfair advantage.

For the first time a DP woman, Steve Shirley of F International

reached the finals of Business Woman of the Year award. Now the IDPM, seldom slow to respond to industry trends, is launching a special recruitment drive to attract DP women to its ranks. Even more positively, the institute aims to encourage female representation within its branch networks and, if it is hoped, at executive council level.

That there is scope for women in DP is undoubted. This role could well involve fending off sundry installation calamities and disasters, placating irate user departments or organising an immediate response from the field engineering team. The sooner, in fact, a DP breed of Linda Carters is introduced the better.

Very probably, DP managers often wish they could resolve all problems by doing a quick turn and bounding off to the boardrooms of IBM, Honeywell or ICL. Having saved the installation and possibly the industry from the latest round of proposed price rises, he returns to deal with more local trouble-spots.

Until now, the role of women in data processing has been that of equality, with perhaps males being a shade more equal. Prejudice in computing has always been non-existent, with hide-bound traditions not having had time to become established. Merit and enthusiasm are the only qualifications which count in most promotion stakes.

Very possibly for the same reason that there are not many women in charge of supermarket establishments or branch banking offices, there are not present abundant numbers of female DPMs. Who then can take the blame for this state of DP affairs? Certainly not the DP industry. The appointment of a

woman as a DP or sales manager or senior consultant is usually the responsibility of the company recruitment or senior managers.

It is customary for all applicants to compete on technical merit, job ability and industry experience. The applicant with the best combination would expect to land the job, and all too often it is a male applicant who has the top score.

Just how the plight of professional DP women can be relieved is one which is, it is felt, occupying the minds of all in the industry. It is not enough for the IDPM to express pious hope that women will be inspired to accept responsibility positions. Suitable training must be organised and women encouraged to take one of professional exams.

Course organisers must do their best to attract senior women to their sessions. Initially the domain of male speakers and delegates. Unless some positive action is seen to be taken, then the female element will have a just cause for grievance.

## 10 years ago

From Computer Weekly of February 19, 1970

THE Minister of Transport, Fred Mulley, told the Committee that a £2.25 million order had been placed with ICL for the System 4/70s for the new licensing centre at Swindon. A meeting held in London decided to press hard for the creation of a software industry association to represent the UK industry. A report presented by the Codrill group to its parent body, the languages committee, set out the way to the development of databases.

PO not bold enough  
on fibre optics

—UNION CRITICISM

THE Post Office is not bold enough in its plans for using optical fibre technology, says a report from the Post Office Engineering Union. The key area is the local network and the Post Office must find practical and economic ways of bringing broadband and digital transmission right into subscribers' premises if UK industry is to remain competitive.

The report also calls on the government to play a part in ensuring that the UK has a significant role in the current technological revolution. First it should grant the £35 to £40 million that the electronic components working party of the National Economic Development Office recommended early last year should be put into investigating optical fibre applications.

Further, the report says, the government should sponsor the experimental "wiring up" of a small community for advanced

telecommunications services such as cable television, digital facsimile transmission and videophone, on the lines of experiments in Japan, Canada and France.

The report acknowledges that about £2,500 million is tied up in metal conductor systems and it would be uneconomic to use optical fibre now. But it says the economics of the technology are changing rapidly and no one in Post Office management is currently prepared to contemplate a broadband local network before the 1990s.

Those closer to the technology, such as Post Office researchers, are rather more excited about the possibilities and an encouraging sign is that the Post Office is expanding the 80-member research team at Martlesham, Suffolk.

Manchester Council  
drops ICL for Honeywell

DESPITE the recent controversy over its intention to switch from an ICL System 4 to a Honeywell machine (CW, January 31) Manchester City Council has formally accepted Honeywell's proposal.

Honeywell won the order, valued at about £1.7 million, in competition with IBM, ICL and Univac, although it was eliminated from first round tender negotiations. When asked to re-tender, Honeywell suggested

that the council could either go initially for a Level 66/DPS 52 and then upgrade to a Level 66/DPS 300, or instead install a DPS58/52 — a machine not yet marketed in this country.

Manchester City Council had decided on the latter system, which will be installed at the end of this year and joined by a second by the end of 1981.

They will handle general local authority applications including payroll.

## University switches to Digital

ICL has lost another major customer in the public sector — this time in Australia. Newcastle University in New South Wales is to replace its 1904A with the biggest Digital Equipment VAX system in Australia.

The VAX 11/780 will take over as the university's main computer, handling administrative jobs ranging from payroll to library book cataloguing and serving research students and

lecturers through terminals. The system being installed can support 64 terminals.

Most of the undergraduate work will continue to be handled by the university's Digital Equipment PDP-11/70, which will be linked to the VAX system. The compatibility between the many PDP-11s around the university and the VAX 11/780 was one reason why DEC won the order.

US appeal  
against  
standards  
ruling

US computer manufacturers are to appeal against the dismissal of their joint court action aimed at preventing the US government adopting the IBM 360 and 370 channel interface as the input and output standard for all government mainframes (CW, February 14).

But although the four companies — Burroughs, Control Data, Honeywell and Univac — have separately filed notices of appeal the court has told them that all these actions must be lumped together as a single appeal.

The companies felt the standard was a backwards step because of the overheads imposed by the IBM channel protocol. They said they would be prevented from entering a big market. Their main case was that the Commerce Department did not have the authority to impose the standard.

## Optical Communications Chair

THE Post Office has set up the British Telecommunications Chair of Optical Communications at Southampton University to support independent research into optical fibre fabrication and applications.

Professor Alec Gambling, seen above centre, is the first holder of the Chair, which is to be supported for five years initially. He is pictured with Dr John Minter (right), head of optical communications studies at the Post Office's Martlesham research centre, who becomes a visiting professor.

On the left is John Whyte, deputy managing director of Post Office Telecommunications, which is planned to rename British Telecommunications after the splitting of the Post Office. He said the Chair would form the basis for developing a research programme with the university.

HP introduces the  
Matrix Machine.

If you've been thinking that only a 32-bit computer can handle your matrix intensive jobs, think about this: with HP's new Vector Instruction Set (VIS), the HP 100 does matrix inversion at speeds comparable to a 32-bit mini. At less than one-third the price.

The HP 100 F-series computer has always been ideal for complex scientific calculations involving floating point arithmetic, trigonometric and logarithmic functions, and other computation-intensive problems. Now it's even better.

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And by taking advantage of the HP 100's Extended Memory Area, VIS can address extremely large data sets (up to 1.8 megabytes) in main memory. All array and memory management tasks are handled automatically, so you can do large array applications like image processing, 3-dimensional graphics, and simulations. Without writing any new software.

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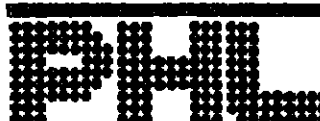
Invest a little time to find out how the HP 100 sixteen-bit computer makes light work of matrix arithmetic. At £27,600, it might save you from investing more money than you need to for your sophisticated

computation jobs. For complete information about the VIS-enhanced HP 100 ring your nearest Hewlett-Packard office or contact Hewlett-Packard Ltd, King Street Lane, Wincoburn, Wokingham, Berks., RG41 5AR. Telephone: Wokingham (0734) 784774.

Matrix Inversion Times*			
Size	HP 100 VIS-enhanced F-series	32-bit Minicomputer	
50x50	1.8 sec	1.5 sec	
100x100	12.3 sec	11.7 sec	
200x200	105 sec	92 sec	
400x400	690 sec	720 sec	

\* Benchmark method - Matrix inversion using Gauss-Jordan Elimination.

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# A TOPS course can open doors you thought were closed

THE definition of a "trainee" varies considerably from company to company and from student to student. Week after week, ads appear in this and other papers for trainee programmers. But have you ever tried to apply for one of these jobs? If so, you will know that this industry, reputedly under-subscribed, is very difficult to get into.

Most people assume that a company requiring a trainee programmer would consider someone completely new to the business but interested in

making a career in the field. This is not so. Apparently, even to start from scratch these days you have to be qualified, and that usually means experience or a degree.

Last week we mentioned that graduates are being encouraged to apply for jobs as computer programmers if they are unable to find suitable employment in relevant fields. But the system works both ways.

There are employers whose definition of a trainee is someone with a degree, in any subject, and they accept no

other applicants. What happens if you haven't a degree, don't possess any relevant experience and still want to get into computing? We have spoken at length about TOPS courses, which seem to be the universal answer to anyone who finds themselves in this position, although many have still never heard of the scheme.

We spoke to a group of students currently engaged in a TOPS computer programming course at the Control Data Institute. Most of them had taken steps to enter the business by

CDI Senior lecturer Roy Aylward with TOPS student Jo Clegg.



applying for jobs which asked for trainee programmers, and had no luck until they were introduced to the TOPS scheme. The Control Data Institute last year trained and placed 1,018 TOPS students. It has seven training centres throughout England.

We visited their London office

which is currently running three courses for would-be programmers, all at different stages of the 18-week schedule, plus other courses for operators, analysts and engineers.

What is the training like? Is there no looking back?

Adrian Hull, 28, was in marine insurance before he took steps to find out about computing as a career.

"There was not enough going for me in my old job," he said, "or any prospect of progress. Computing seemed more demanding and rewarding. I spoke to some friends about it and finally applied for TOPS after seeing a CDI ad in one of the evening papers."

If you have decided to change your career completely, then you have to be prepared to wait. Adrian Hull waited six months between qualifying for a TOPS course and actually starting one.

He has now only a couple of weeks to go before he starts as a trainee programmer with Civil Aviation. Has it all been worth it?

"It is a very intensive course," said Hull. "It required a lot of travelling and working in the evenings. But I have been offered three jobs, all at higher salaries than I was earning before, and I now feel I've a good grounding in computing."

The students we spoke to were unanimous that the course was not easy, but definitely enjoyable. CDI, however, takes great pains in selection techniques to ensure that it picks only those people who are sufficiently self-motivated to get on.

The training is done using a modular technique, where each student is given a manual and has to work his way through each unit before starting the next. Although a lecturer is always present to help with any problems, the students are encouraged to work on their own and at their own pace. Audio-visual training techniques are used extensively and practical work is included in the syllabus.

One of the most interesting aspects of CDI training is that, unlike the TOPS courses offered by other companies, the firm provides training in three programming languages: Assembler, Cobol and RPG II.

John Lowe, the career entry training and sales manager for CDI, said, "This means we can provide an understanding of a high and low level language and also that our students are equally attractive to ICL and IBM users."

"I found Assembler the most difficult," admitted Jo Clegg, who worked in banking for eight years before taking the TOPS course. "Luckily it was the first thing we did on the course and consequently, by the time we came on to Cobol and RPG II, everything seemed to fit into place."

This was confirmed by 22-year-old Shelley Cohen, who is at the moment only a third of the way through the course and is still attacking Assembler. "We were taught the basic concepts using a hypothetical language," she explained, "which made things easier."

Shelley, formerly a secretary in the computer department of a large company before deciding to make a career in computing, admitted that it is not easy to get used to settling down at night and doing homework when you have been out of full-time education for a few years, but has no qualms about the decision she has taken and is now "totally convinced" she has chosen the right career.

Another satisfied student is Steve Povey, who at 25 is about to embark on his first job in computing as a junior programmer with the oil company of Conoco on a starting salary of £5,000, again more than he was earning in his previous job as a management services where he became acquainted with the type of problems computers can solve, although he had no contact with them.

His only complaint was that the course had not covered the different types of operating systems and he felt that it would have been useful to know in which circumstances to use one programming language and not another.

So if you are prepared to sacrifice a bit of time and money, although the TOPS grant is reasonably generous, the scheme can open doors which are apparently closed to many would-be programmers. CDI placed 96% of its TOPS students last year, and future plans include the use of Plato, CDI's computer-aided learning system already used by CDI's own students.

As Adrian Hull summed up: "This system gives everyone a chance to get on purely on their own merits, irrespective of their fact that they might not have any formal qualifications or relevant experience. If you work, and you're good, then you can get a job and it doesn't matter at all what you were or what you did before."

by Judith Morris

## SOFTWARE FILE

# Hazardous gaps in law of copyright

IN the UK we start the 1980s with no case law or adequate statute law to cope with the burgeoning computer industry. We have recently seen in the case *R v Pettigrew* (The Times, January 22, 1980) that there is a gap in the law of criminal evidence concerning admissibility of computer output (CW, January 31). However, the gaps in English copyright law present hazards to investment and the sale of computer equipment.

Internationally in the field of software copyright there have been a few cases. In France in 1978 an ex-employee of the French car firm Peugeot was convicted of theft of a data

perpetrated that declared the disputed computer program was a "new and independent scientific intellectual work eligible for copyright protection."

The court ruled that the ex-employee, as author, had the right of utilisation of the program.

Another court decision has been reported involving a Romanian software house whose employees departed with programs they had written as part of their work.

Subsequent use of one of the programs by the ex-employees was held an infringement of the copyright in that program. The copyright was determined to be owned by their former employer as the result of the Romanian "work-for-hire" doctrine.

The earliest case concerning software copyright appears to have been in 1971 in Finland where a programmer, after leaving his former employer, a data service bureau, started a competitive bureau with another former employee.

The new company entered into a data processing agreement with a former client of the ex-employer and programs for the data processing were developed by using program listings that the programmer had developed for the ex-employer. At least parts of the programs were taken directly from the listings.

The City Court of Helsinki found the programmer and the other employee guilty of unauthorised use of a trade secret and also of infringement of copyright.

However, on appeal a majority in the Court of Appeals did not find the use of the program listings constituted any violation of Finnish copyright law.

Nonetheless the court found for the ex-employer on other grounds and awarded damages calculated on the basis of an expected three year life of the programs and the fact that the said programs had been used without major alterations.

The copyright laws of the Scandinavian countries are very similar and it may be the case that software is not regarded as a class of copyright work.

Since the case was decided nine years ago I suspect that any current case will either overrule the decision or distinguish it on its facts.

Alistair Kelman looks at legal protection for programs

## How to protect the fruits of our labours

**ALISTAIR KELMAN** will be addressing the next meeting of the British Computer Society's law specialist group on "Copyright and computer programs: a new approach" in the Olivetti Room, 85 Grosvenor Gardens, 13 Mansfield Street, W1 on April 16, 1980. It will start at 8.00 pm. Kelman is a practising barrister who writes programs. He has taken a special interest in the copyright protection of software.

It is what I have termed the "Programmers on typewriters" argument. It is based on the theoretical existence of an optimal program which, as a mere idea, would be excluded from copyright protection.

Given an infinite amount of time any number of programmers working on the same program in the same data processing environment will all produce identical and optimal solutions.

It is said that the objective in computer programming is to design near optimum systems which involve matching program requirements with computer characteristics.

To the best of my knowledge this argument has not yet been tested in any court of law.

ALTHOUGH the problems of software copyright are serious when computer programs start interacting with other copyright products such as books, music and drawings, the legal adviser to a computer company enters a "no man's land".

In my view we need to tackle these problems by analysing what is meant by copyright, what it protects, how a computer handles data and programs, how programs and data interact in computers, and then define satisfactory terms to cover the mechanistic activities of the computer so protecting the rights of the producers of original copyright works.

In my draft Bill to amend copyright law I have utilised the old word "transmutation" to cover the automatic conversion of a source work into object code.

I chose this word because it has an overtone of conversion, it

has no existing legal meaning, it has no specialist mathematical meaning (unlike transformation), and it emotively conveys the significance of the conversion of "base" source works into "golden" object code.

Transmutation in the computing sense, is a global term and thus assemblers and compilers are both transmutators. An interpreter performs a transmutation upon a source program and thus the copyright rights in the source program are not diluted by the mechanistic process.

Good legal concepts are fundamental for growth of investment in any sphere of human activity.

If computers are to be used by everyone then the fruit of the labours of those that use computers and those that develop and create computers, must be protected against theft.

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Puzzler



THIS week's problem is to slice a pentagon into three pieces that can be rearranged to form a parallelogram. No piece is to be turned over at any stage, and the pieces must be made by straight cuts through the pentagon. See page 53 for solution.

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## OP SPOT

## 'Bi-focals can hinder VDU users'

DON'T rush off and buy bi-focal, tri-focal or vari-focal spectacles because they won't do you any good — they might even prove a hindrance.

This piece of advice for VDU operators with poor eyesight comes from Dylan Legge, a programmer who was employed in "the optical business" before he entered computing.

Responding to an Op Spot piece reporting on a paper from the Optical Information Council entitled "Visual display units: their effects on the eye", he comments: "The problem mentioned should be of no concern whatsoever to any but a tiny minority of VDU workers who are over the age of 40. And I don't think there can be many of them about."

"No matter whether one is short-sighted, long-sighted or whether one suffers from astigmatism, the human eye is constructed with a remarkable and

efficient variable focus mechanism.

"By means of this, with ordinary single focus lenses to correct any of the above mentioned defects, the eye can easily, rapidly and frequently change its focus and observe clearly any object from the distance of 10 inches to infinity."

But the council isn't claiming that those spectacles are the answer to all VDU-related problems.

Director John Stallwood, commented: "What we're suggesting is that they provide one of the many solutions to the problems that VDUs are throwing up."

He went on to agree with Legge that bi-focal, tri-focal and vari-focal lenses are only likely to be needed by middle-aged people.

"All of us can accommodate little defects, but the brain has to put in that bit of extra effort."



Shift work may disrupt your social life but it does provide the chance to do those jobs which would otherwise engage weekends and holidays. Our picture shows operator Dave Townsend converting an attic into a bedroom at his home in South Wimbledon.

## The dangers of changing your installation

by Bernard Allen

MOVING from your current site to a position at another installation is a simple and straightforward matter — provided you have one or two years' sound operations experience, that is.

You just shop around the computer staff agencies until you come across a site which needs your experience and has the right things to offer in terms of salary and position.

All very straightforward — but deceptively so, in my opinion. The fact is that staff often fail to realise that the role played by the operator varies considerably from one installation to the next.

Operators often come in for a surprise on attending the installation for their first day's work: they realise that techniques used day in day out at their previous site just don't apply or are unacceptable to their new employers.

The hardware and software may well be the same, or very nearly so, but the part played by the operators is greatly influenced by other factors, such as the attitude of the DP and operations managers, the technical expertise of the resident staff, the size and organisation of the site and the nature of the business in which the employer is involved.

The attitude of the DP and operations manager to the operators is of great importance. It is they who determine whether the operators get involved in the running of the entire installation or just the computer room.

Some managers encourage the operators to learn about existing applications and those being developed at the site. At such sites, the operators sit in at meetings related to "their" particular applications.

This sort of approach gets staff out of the computer room now and again. It adds to their level of expertise — and that can only benefit the installation.

Managers determine installation standards. At some sites the operators are expected to know and apply fault diagnosis techniques, while at others the system programmer is called in at the first sign of machine trouble.

The nature of the concern served by the installation is of great significance. Compare, for example, the informal and easy-going environment of the university site with the "collar and tie" image of the bank installation.

At the typical university site everyone is on first name terms. There is not a lot of pressure and the operators are left alone to a great extent — as long, that is, as the work gets done.

Life is rather different for staff at the bank installation. The formal attire reflects the whole environment as they have to put up with all sorts of rules and regulations, and are often interrupted by visits from branch staff.

All that is offset to a considerable extent because they invariably get an excellent formal training in operations.

In my view, too many operators accept a site's shift pattern without considering the implications of it. If you have no experience of the 12-hour shift rota, getting a bus home the morning after the night turn can be a sobering experience.

Rest room facilities is another consideration which shouldn't be underrated when moving site. Frequent breaks in a well-furnished rest room and facilities for cooking food on the evening and night shift may mean the difference between happy and discontented staff.

## Look to machine room for potential managers

SITES should seriously consider staff in the computer room when looking to fill some of their higher positions. But, of course, many don't.

So career progression continues to be a real problem for operators, while recruiting DP specialists causes headaches for many an operations and DP manager.

But who is really to blame for this ridiculous state of affairs? Is it the fault of the industry for failing to realise the talent that exists in the computer room or, if we are really truthful about it, are there a lot of operators who just aren't interested in promotion?

These questions are raised by John Wedge, a Burroughs 3600 operator who has been in the industry for some two years and is interested in furthering his career.

"That employers should consider operators for higher positions goes without saying — they have seen the operator in his working environment and are therefore in a good position to judge whether he is capable of filling any vacancy that exists."

"When a firm recruits externally it is never really sure what it is getting, regardless of inter-

views and references, until the individual starts work."

According to Wedge, there are three basic reasons why operations staff get overlooked when sites are looking to fill the so-called more technically-demanding positions.

"Firstly, operators are recruited at a relatively low level — most sites being content with just a few 'O' levels.

"Secondly, very few operators are career-minded. If you push them on the subject they will vaguely say that they would like to end up in programming, but usually their horizon doesn't extend beyond their present job."

"Thirdly, a number of sites, like my own, are just too small to be able to provide a career structure within the operations sphere."

There are some "very gifted" persons within the operations fraternity but they succeed in spite of the system rather than because of it, he added.

I must disagree with our friend when he says that a lot of operators just aren't interested in making good in the industry. As I see it, DP managers must shoulder most of the blame for failing to recognise the true value of their operations staff.

## WP maker launches UK selling drive

ONE of the leading US word processor manufacturers, CPT of Minnesota, is launching a drive to sell its machines on a large scale in the UK, with the setting up of a marketing company jointly with Spicers International, an offshoot of the paper-making group. The staff of CPT's current UK agents, Tucker Business Associates are being absorbed in the new company, CPT UK.

CPT is now claiming to be the world's second largest supplier of screen word processors, ahead of Wang and behind Lanier (which sells AES in the US). Negotiations are going on with Spicers over possible marketing of the machines in Africa and the Far East, where Spicers is already involved in selling photocopiers.

CPT's marketing arrangement with mainframe maker CII-IB in France is unlikely to be affected by the new deal (CW, February 15, 1979). However, Honeywell had been thinking of making more of the link with CPT as part of its effort to get further into WP, along with the other computer manufacturers.

These ideas would be restricted by Spicers' exclusive agreement. The two main products involved are the CPT 8000 and 6000, with full and half page screens respectively. They are notable for their black-on-white screens. A shared resource system called Wordpak is already available in the US and it is intended to introduce it in the UK soon.

The current predictions are included in a booklet\* available free of charge from PCML and were finalised on December 1 last year, so they might not be totally accurate now, according to PCML. The December 1 predictions for a two-megabyte 3031 show a decline in value from £446,000 to £125,000 over the next three years, but the rate of decline could be changed by the announcement of the 4351.

From May this year the PCML service should be available online from the Bristol centre of Datema, the big Swedish-based bureau, on its APL facility.

PCML hopes that the service will also be run at Datema's Stockholm centre because IBM users all over Europe will then be able to access the service cheaply via concentrators in the Datema network. But before any users can be offered direct

## Information service for users of IBM kit

THE present low value of the dollar that is encouraging the import of IBM machines from the US is just one factor taken into account by Peripherals Computers, Memories and Leasing, PCML, which is introducing an information service for purchasers and lessees of IBM kit.

The service will provide its users with three types of information: the availability of various IBM models in Europe, IBM equipment price projections on a quarterly basis for three years or more ahead, and information helping the IBM rental customer to decide if it is worth doing a sale of installed, SOI, deal with IBM.

Price projections already available from PCML include figures showing that the value of a one-megabyte 370/148 should fall from £150,000 now to less than £70,000 in 12 months' time, to £44,000 in two years and to £27,000 by early 1983. The corresponding figures for a two-megabyte 370/158 Model 3 are £255,000, £158,000, £102,000 and £67,000.

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access PCML and Datema will have to work out some suitable method of charging them. Until then PCML itself will access the service on behalf of users.

PCML is building up an online database at Datema of IBM kit installed all over Europe and its degree of completeness will determine the accuracy of factors like the availability and age of kit in the field.

Other decision-making factors taken into account include the number of order positions held by leasing companies, the effect on prices of new IBM announcements and current exchange rates.

Price predictions will be updated each quarter using weighted parameters.

Asked about the effect of exchange rates at the moment PCML said that the US prices of the System 38, the 303N and the 3880 disc controller were very attractive compared with IBM UK's charges.

According to PCML, the 3880 is 25% cheaper in the US while

the System 38 is 92% of UK list price. PCML pointed out that a broker can make money by importing a box from the US because of the price difference.

PCML emphasised that its service was not an additional marketing tool for its existing leasing and brokerage business, but would be developed into a major activity in its own right. It could be extended to include other manufacturers' equipment such as Digital Equipment kit. PCML believes that its service will not be welcomed by a lot of other brokers and leasing companies because it will give IBM users a clearer idea about matters like leasing terms and second user prices.

PCML was founded about three years ago and used to be called System Performance Ltd. It sells and leases plug compatible kit and used IBM processors.

IBM/CPU Price Projections, Peripherals Computers Memories and Leasing Ltd, Woodend, Byfleet Road, Cobham, Surrey KT11 1DY. Tel: Cobham (08328) 7111.



CHICKEN manure is big business for Wing Commander Grenville "Jaap" Green, DFC, whose firm, Organic Concentrates, supplies 50,000 gardeners all over the country with its 8X brand of 100% organic fertiliser on a mail order basis. Green runs the firm from his home at Little Chalfont, Bucks, and is seen here in the homely setting of his dining room with one of the two Ventak 1100 computers used by his company to process between 100 and 200 orders received every day. Life is made simpler because cash is sent with each order so there is no need to run a detailed ledger system, but the Ventak machines are kept busy with other jobs like word processing.

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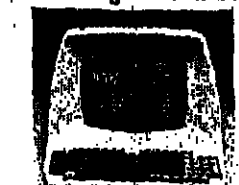
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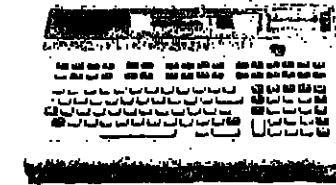


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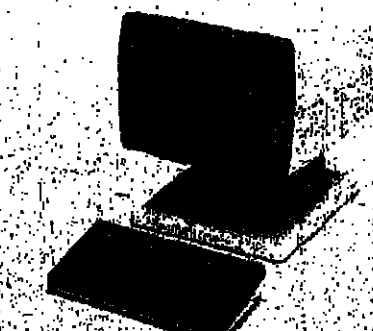
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April 1980



## PEOPLE and EVENTS



## Panton joins the board

CHAIRMAN and chief executive of Telecomputing, Bernard Panton, has become a director of ECS Microsystems. The company was formed in 1979 when Electronic Control Systems transferred its international headquarters from Sydney, Australia, to San Jose, California.

Jan Reynolds has become manager of product support with Anderson Jacobson of Slough. He was formerly senior technical specialist with the European support group of Data 100 which he joined in 1977 after leaving Cise.

Tony Moonshine has become public relations manager with Data Logic. He joins the company from Gelsco where he was a sales promotion consultant. Newly appointed manager for manpower planning and resourcing is John Wilson. A qualified psychologist, he joined ICL in 1970 and his last position was recruitment manager with British Airways.

Ed Morris has been promoted to sales manager with micro-computer specialists Lion Micro. He was formerly sales consultant for the company.

Phil Parkin has joined Computer Time Sharing Services as marketing manager. He was previously a sales executive with MDS Data Processing.

## President appointed by Machines Bull

COMPAGNIE Machines Bull, the French state owned firm which is the principal shareholder of CII Honeywell-Bull, has announced the appointment of Roger Fauroux as president of the company.

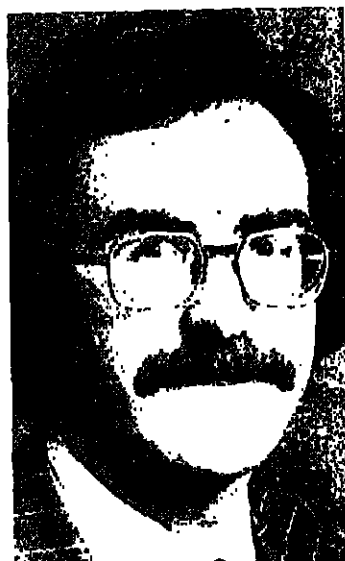
He is presently managing director of Saint-Gobain Pont & Mousson, and succeeds Henri Maurice Delage who has retired after heading the company since 1972.

Fauroux's appointment follows the purchase by the Saint-Gobain Pont & Mousson group of CGE's 20% holding in Compagnie Machines Bull (CW, January 24).

Bryan Bates has become UK sales manager for Allied Business Systems after working for the company for eight years. Manager of ABS' new OEM department is Bernard O'Leary, who joined the company four years ago.

Malcolm Bowden, until recently sales director of Digico, has joined Intersect Computer Systems to control the sales and marketing activities of the company.

Bob Stewart has been appointed managing director of Computer Management Group (Scotland). He has worked with CMG since 1989 when he joined the company as a consultant systems programmer.



Darlington

## Fellowship for POEU official

THE 1980 Travelling Fellowship from the Winston Churchill Memorial Trust has been won by a 31-year-old official of the Post Office Engineering Union, Roger Darlington. For six years he was political adviser to Merlyn Rees, MP, and he has been assistant research officer at the POEU for the past two years.

The award will enable Darlington to study the US telecommunications system from both technological and regulatory points of view. He is already involved in the debate on the Post Office's telecommunications monopoly and has drafted the POEU's submissions to the Department of Industry. He is the author of POEU studies entitled The Modernisation of Telecommunications, and Optical Fibre Technology, and has attended meetings throughout Europe, discussing new technology with trade unionists from 17 countries.

## DIARY

FEBRUARY 21-22  
IBM CUA operations group, Shakespeare Hotel, Stratford-on-Avon. Tel: 01-551 1643.

FEBRUARY 27  
Microprocessors for developing countries. D. Waller. Followed by wine and cheese. BCS specialist group for developing countries/ British Council. British Council Students Centre, Portland Place, London. 18.15.

FEBRUARY 28  
Confidentiality and statistics. BCS/Royal Statistical Society. University of Strathclyde, Strathclyde, 19.30.

MARCH 3  
SMA and its alternatives, and AGM. BCS Data Communication group Institute of Education, Bedford Way, London. 10.30.

MARCH 4  
The impact of automation. BCS. IEE, Savoy Place, London WC2. Tel: 01-240 1871 ext 261.

ADA - the US Department of Defence real time language. BCS North Staffs group. Ambassador Hotel, Newcastle under Lyme. 20.00.

Online information users in Scotland. BCS Information Retrieval group to inaugurate a Scottish group. Contact L. Corbett, University of Stirling, Stirling.

MARCH 5  
Query languages. BCS Database users. University College, London. 14.00.

MARCH 6  
Fault tolerance. Prof M. Bruer. BCS. IEE, Savoy Place, London WC2. Tel: 01-240 1871 ext 261.

MARCH 11  
Data protection legislation and the likely effect on you. IDPM Essex branch. County Hotel, Rainford Road, Chelmsford. 20.00.

MARCH 18  
The complexity of problems and the human mind. British Chapter of the ACM. BCS '80. 13 Mansfield Street, London WC1. 18.30. Tel: 01-980 4811 ext 828.

## Abacus UK sales chief

MICROSYSTEMS distributor and consultancy Abacus Computers, formed just over a year ago, has announced the appointment of Terry Lewsey as UK sales manager. He will be responsible for all sales and marketing of the company's range of TEL computers and terminals and the Computrol microcomputer. Lewsey was until recently sales manager for the business equipment group, Texas Instruments.

Barry Grange has been appointed a director of Tesco Stores. He has recently been in charge of Tesco's computer division. He joined the company as chief programmer and then has held the positions of executive director of Tesco Management Services and came a full director in 1977.

Finn Melland has been elected vice-president and general manager for the European marketing and services operation. General Electric Information Services Company of the US will be based at headquarters, Kingston-upon-Thames. He joined the company on its formation as European manager.

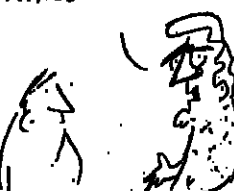
Ted Quillin has joined General Technology Systems as a senior consultant. He previously worked for Plessey where he held the positions of engineer, manager of the Plessey processor unit and project manager. The EEC Commission study computer aided design techniques in digital electronics.

Jonathan McKay has joined Documentation as a sales executive from Univac, where he was in sales.

## Lifestyle File

by Don

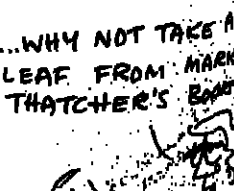
IF INMOS CAN'T RAISE THE WIND...



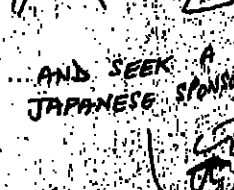
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...AND SEEK JAPANESE SPARKS



## DONALD KENNETH HEARS USERS' VIEWS ON COMMUNICATIONS

## PSS heralds advent of distributed processing

THE much heralded advent of distributed data processing will finally come about after the public packet switched networks get going this year. This is the view of Dr Ron Ewins who last week presented the results of a survey conducted by his company, John Hoskyns, among 10 major UK data communications users.

Several members of the 10 user companies which participated in the survey had expressed fears that the Post Office would force them to use public services rather than leased lines by manipulating the tariffs.

This was unlikely, Dr Ewins thought, although there would be a gradual shift in favour of X25 networks particularly for organisations with large geographic spreads.

That trend would be reinforced by the willingness of smaller computer suppliers to support X25.

On the other hand neither would the Post Office use its monopoly on provision of service to inflate the packet switching tariffs and it had undertaken to base prices on costs.

These costs were dictated by the level

of peak usage requirements while revenue was related to average usage, so the Post Office would want to keep the ratio between the two close to unity by encouraging a balance of different types of traffic, such as interactive time sharing terminals by day and updating of distributed databases at night.

Attracting these types of traffic would result in a fairly small, efficiently-used network which would not compete with large companies' leased line networks, but would allow companies that could not justify leased lines to engage in distributed processing.

Another disincentive to distributed processing that had counteracted the effect of falling processor costs was the cost of manning distributed installations. This was being overcome by suppliers producing systems designed for the office environment and having simple user interfaces.

The higher volume online order entry and customer inquiry applications would not be attracted to PSS because of the volume-related tariff, Dr Ewins thought, but would use leased lines until

a fast circuit switching service came in on System X.

IBM's 8100 series might be a catalyst in getting mainframe users to look at distributed processing. Many might be put off by the long lead times quoted on it and go on to evaluate other distributed processing products.

The IBM Systems Network Architecture was not catching on because users were uncertain about the software burden. Also, although it was six years old, the first products supporting it did not appear until 18 months ago. Big user organisations had by then achieved equivalent benefits using concentrators. They had acted quicker than IBM could.

IBM's implementation of X25 offered in Canada and France for the Datapac and Transpac packet switched networks was not very efficient. It simply put an X25 frame around all the data including the IBM network control signals.

But then IBM had pointed out that implementations of X25 differed slightly in the various public networks so it was too early for a finalised offering.

IBM's NPDA network problem determination application, however, was a fundamentally different approach to network control that might give rise to an IBM plug compatible modem market in three or four years' time like the present one for VDU products.

Operating in conjunction with the network communications control facility in an SNA network, NPDA interrogated microprocessor based modems to provide error statistics and to narrow a fault down to a part of a datalink and give a probable cause.

Other network control systems required careful evaluation. Many users were looking at them, but few were using them. They were very good in a multipoint network if one modem went down but not so useful in a point to point network.

Line data displays on the other hand were versatile and powerful. Able to trap error conditions, they could also record data and performance information. Four of the 10 organisations in the survey used them and several more were evaluating them.

Managing data networks was in-

## Management problem

INTEGRATION of voice and data in company networks was matched, said Dr Ron Ewins, by the Post Office's plans for System X, published by CEPT last year. This included plans for 64K bps digital links into subscribers' premises, although later on it was expected that subscribers' links would be wideband, capable of carrying signals from a digital PABX, several channels from a mainframe or front end processor, video teleconferencing, high speed digital facsimile, bulk message switching and interactive terminal links all via a super front-end controller to a single network connection.

The technology was there, Dr Ewins said, or would be within the decade. It was just a management problem to introduce it and to find the people with the required knowledge and experience.

creasingly going to be about change, including integrating data and voice traffic, and for larger networks specialist control staff were recommended.

A co-ordinator was also suggested, to have overall responsibility for communications and to formalise procedures for keeping everyone informed and for dealing with problems.

Published plans of System X development showed that from the first installations this year or next, a linear growth was expected which would take in all major cities by 1986 and all significant conurbations by 1990.

Leased digital lines would have a steep growth to saturation from 1982 or 1983 and a synchronous circuit switched digital network would be around 1984, with a possible pilot scheme in advance once System X installation had started.

Post Office plans were questioned from the floor and it was pointed out that Modem 12s for the Datel 2412 2,400 bps service took several years to reach the market and now the lead time was terrible, so what hope was there when something really complex happened?

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## MICRO NEWS

## Striking out on his own from Nascom

KERR BORLAND, one of the personalities of the microcomputer industry in the UK, has left Nascom Microcomputers to set up his own marketing company.

After two years with Nascom, in which the original idea for the Nascom 1 microcomputer kit has grown from an embryo to a business now reckoned to be turning over some £4.5 to £5 million a year, he has felt the need to seek new pastures. His company, Product Launch, will be geared to exploiting what he feels is his major talent, constructing a marketing platform from which to launch new products.

Though he will not be concentrating his efforts solely on the microcomputer business, he does not intend to lose touch with it. "There are hundreds of

people in this business with good product or service ideas, but without the expertise to market them or manage their launch on to the marketplace," he said. The microcomputer industry is ready for some marketing expertise.

Product Launch was formed at the beginning of this month when Borland resigned from Nascom as marketing director. One of the first clients he picked up was Nascom itself, and one of his briefs with the company will be to find a new sales manager to replace that part of his own previous function.

More in keeping with his new company's operations, he will also be handling a product launch for the company towards the end of this month.

Borland is collecting about



Kerr Borland

him a team of freelance specialist staff that he hopes, collectively, will be able to offer small companies a wide range of marketing and management oriented skills on a short-term contract basis. Typically, he feels, this will be about three months for the launch of a specific product or service.

## Pet changes likely to affect PCMs

by Martin Banks

THE analogies drawn by Kit Spencer, general manager of Commodore in the UK, between the US microcomputer manufacturer and that giant of the mainframe computer business, IBM (CW, January 3) appear to be growing.

Commodore is planning changes in both the firmware Basic interpreter and disc operating system for its new large-screen Pet computer that will push the plug-compatible manufacturers to extend their own product offerings to match. The company, according to Spencer, has a new Basic under test at present, with a new disc operating system. Called respectively Basic 4.0 and DOS 2.0,

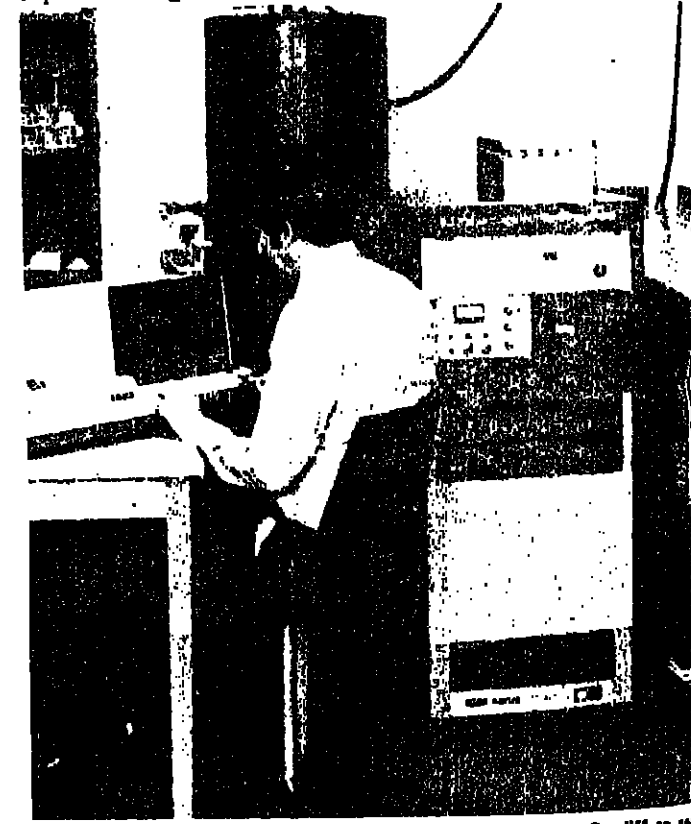
there are suggestions within the industry that they will negatively impact a major PCM supplier for the Pet, Compu/Think. Sold in this country by ACT, the Compu/Think 800K-byte floppy disc drives will probably not be compatible with the new version of the computer.

Reported to have the working name of the 8000 series, this is a system on which Commodore will be pinning considerable faith. Offering a full 80-column screen size, and probably 64K-bytes of memory as well, it is the next logical extension of the Pet as the company moves further away from the hobby and personal market and towards the small business user. Though there are unconfirmed reports of eight-inch floppy

drives as well as a Winchester hard disc coming from Commodore, an immediate source of large capacity storage for the 8000 series could be essential if users wish to make full use of the system's potential. This, in theory, puts ACT in a strong position, so long as the drives are compatible.

The new Basic and DOS are unlikely to appear on Pet systems currently in production. The 8K, 16K and 32K-byte machines. However, a user wishing to upgrade just the computer and not an existing Compu/Think disc system could have problems.

An ACT spokesman said last week that as a company, ACT was not worried about the Commodore move, as Compu/Think's business is as a PCM



NEW technology is being used at University College, Cardiff to set details of the old — in fact about as old as you can get. Our picture shows what is believed to be the first computer-controlled superconducting palaeomagnetic laboratory of its type in the world at the university, where it is being used to research into fundamental geological theories such as continental drift.

Based on an SWTPC 6800 microcomputer, the laboratory can determine automatically the magnitude and direction of the earth's magnetic field at various periods throughout history by measuring the residual field in a dated geological or archaeological specimen. The results of these studies indicate, among other things, that the direction we today call "North" has reversed several times since the formation of the earth. It was last seen going past Nazeaton, beamed down the North Circular.

## 9440 clock speed is no advantage—report

THE high clock speeds of the Fairchild 9440 Microflame 16-bit microprocessor offer little advantage to the end user of the part, primarily because it is manufactured in bipolar technology.

This is one of the key factors to arise from an examination of the processor published by Microcomputer Analysis.

Though bipolar technology offers several specific advantages, such as a single phase clock, and an operating capability over the full military temperature range of —55°C to 120°C — as well as the high clock speeds which in the 9440 go up to 12MHz — the report points out that it also has a specific disadvantage. This is that component packing densities per chip are low, especially when compared to the prevalent MOS technology used in microprocessor devices.

This means that though much faster than MOS parts, where clock speeds are typically around the 2-MHz mark, the 9440 requires a much larger external complement of peripheral

and support devices to construct a working system. This increase in total system chip count normally leads to an overall degradation in the operating speed of a system, and leaves the 9440 with little advantage over other, MOS produced, microprocessors.

By comparison, Microcomputer Analysis also looked at the Ferranti F100-L and the Texas Instruments SPB9900, 16-bit microprocessors, both of which are produced in bipolar technology.

With the Ferranti part, the report states, it was found that the multiplexed bus system and its associated memory reduced the potentially high speed of the system down to a level comparable with MOS devices. Texas has not claimed any particular speed advantage for its own part.

"Microcomputer Analysis is published by Mackintosh Publications, Napier Road, Luton, Beds.

## Graphics for Apples

A GRAPHICS tablet package for the Apple II has been introduced by the company's UK master distributor, Microsense.

It consists of the tablet itself, with an 11-inch-square writing area, menu overlay, stylus, interface card for the computer, and a software package held on floppy disc. It has been designed to operate with Apples using a minimum of 48K-bytes of memory running Applesoft Basic.

A wide range of standard menu functions is provided. The complete package is priced at £462, and is available through appointed dealers.

## TRS-80 workshop

A WEEKEND workshop is being planned by the National TRS-80 Users' Club for April.

The residential workshop will be held in Milton Keynes College of Education over the weekend of April 19 and 20. On the Saturday, there will be presentations of the latest software for the machine, with some of the latest hardware updates from Tandy. On the Sunday, the club plans to run a series of tutorials.

Further information and booking forms can be obtained from Brian Paine, 40A High Street, Stony Stratford, Milton Keynes, or by telephoning him on 0908-5560.

## IBM's Information Distributor star of the show

RORY JOHNSTON REPORTS ON INFO 80

THERE are so many computer conferences in the calendar these days that it was inevitable two should end up with the same name. Last week's Information Management Conference and Exhibition, Info 80, at the Cunard Hotel, London, was not to be confused with the event with almost the same name, shortened to Imec, running this week at Wembley Conference Centre.

On show at Info was a range of equipment, accessories, and services oriented mainly towards word processing.

Star of Info 80 was the IBM 6870 combined xerographic printer and photocopier, a product generally known in the trade as an "intelligent copier", but which IBM, going its own way with names as always, calls the Information Distributor.

The 6870 was launched in the USA a year ago (CW, February 22, 1979) and here in September, but this was the first chance it has had to show off its myriad paces at a show.

£51,000 is a lot of money for either a word processing printer or a copier, which explains why, to date, most installations in the UK have been in DP environments, attached to a host. It acts as a fast, high-quality computer printer producing text on A4

sheets, sideways, as an alternative to the usual continuous stationery. Only one type font is available in this sideways mode (including lower case) but the quality is much higher than normal line printer output and both sides of the paper can be printed.

Otherwise the 6870 acts as a word processing printer, fed either from a mainframe or from a word processor using IBM's favourite veteran technology, magnetic cards. The output looks like a fairly good photocopy of normal typing. The capability of this laser technology to produce high-quality graphics fonts has not yet been taken up by IBM. Maximum speed is 36 pages a minute, up to 100 pages can be collated, and vertical and horizontal rules enable bar charts to be drawn, and forms to be printed at the same

time as their contents.

The machine's name comes from its ability to communicate automatically, under the control of instructions fed in on magnetic cards. Thus documents can be sent to a variety of different destinations such as word processors and other 6870s, providing the beginnings of electronic mail.

Naturally with so many functions, the 6870 is non-trivial to operate, despite elaborate operator aids, warning lights and so on. It is being installed in end-user departments, fed from a mainframe remotely, but mainly in such organisations as insurance companies.

Several word processors were on show for the first time in UK, including the NBI 3000 on the Ventek stand, IBM's 50 and 60 electronic typewriters, and the new Ontel, in two different

guises. Monotype Communications sells it as the 150, while Intertec calls it the Wordcom 10. This machine is notable for its forms capability, and the ease with which forms can be constructed by the user. On the other hand, editing operations are rather cumbersome, using lots of function keys and extra controls assigned to letter keys besides.

Just the opposite applies to the Siemens Word Bank word processor, which has been around for some time but without any particular push by the company to sell it. Editing functions on the Word Bank screen are very neat, but forms construction is highly complicated and usually done for the customer by Siemens.

Siemens is making plenty of money these days selling floppy discs and printers to WP makers, OEM, and so has not been particularly worried about selling the Word Bank to anyone other than existing customers. Attracting a lot of attention on the stand, however, was the 270 characters-per-second ink jet printer, which costs £1,600. It uses a dot matrix, 12 by 9, and so has less definition than IBM's

## Standards for electronic mail

THE biggest challenge to the burgeoning "information economy" is the establishment of standards for electronic mail, to enable people to communicate without prior agreement and formal introduction, and the first country to establish effective standards will have an enormous competitive advantage in the information trade. That was the point made by Adrian Norman, of consultants Arthur D. Little, speaking at

the Info 80 conference. The Royal Mail and the telephone achieved this in the last century, Norman said, and it was vital for the UK to press ahead with developing standards for "open system working".

Norman was keen to improve communications, to launch an attack on "the soft underbelly of today's information processing systems, the public sector bureaucracies."

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AS/7000N outperform even the IBM 3032 and 3033.

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## Versatile system

IBM's 6870 Information Distributor is a useful word processing printer but is too big and expensive for most ordinary WP applications. However the machine also serves as a copier and the 5,000 copies included in the monthly rental of about £900 could make it an attractive proposition.



ink jet and is not suitable for word processing; a WP version is under development but will probably not be on the market before 1982.

Another notable feature of the Siemens word processor is the "smooth scrolling" of the screen. When scrolling up or down, the text does not jump from one line to the next as normal, but shifts from one dot of the matrix to the next, giving the impression of continuous movement like television captions. This is easier on the eyes. Siemens expects this to give the firm a major competitive advantage in Scandinavia, where concern for side-effects on workers such as eyestrain is increasing and may soon lead to legislation insisting on smooth scrolling among other things.

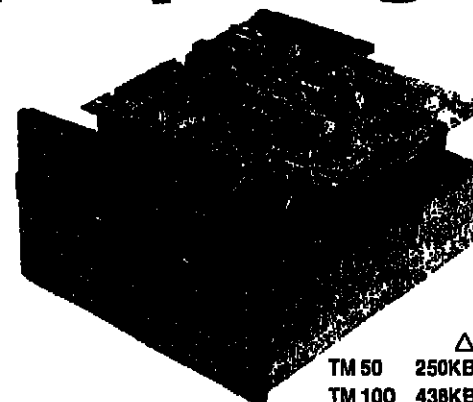
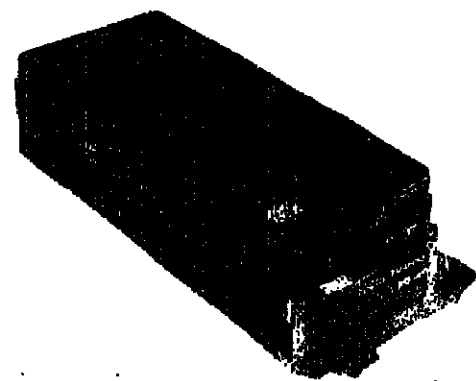
Communicating was a widespread theme of the show. Several exhibitors had hardware and software for feeding Telex messages straight from word processors on to the network without re-keyboarding. Case demonstrated how its Data Concentrating Exchange can be used to send word processing documents down private DP networks, and how the Message Switching Exchange will provide store-and-forward facilities for WP.



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## MARKETVIEW

# Does the 4331 shape up as a distributed processing satellite?

THE suitability of IBM's 4331 for distributed processing networks has been the centre of some controversy. The pros and cons of these arguments were considered in some detail at a conference in London in January which dealt with The IBM Impact on Distributed Processing (C'W, January 24). The subject was approached from widely differing positions but, with the hardware and software at present available, both sides could be right.

Bud Kutnick, of the Yankee Group which organised the conference, and I saw the IBM

machine as expressly designed as an entry level unit to be installed at end users' sites as distributed processing satellites to larger IBM mainframes.

The other view came from Larry Woods, distributed processing manager at the Deere Corp of Moline, Illinois, who saw the 4331's greatest asset, its 370 compatibility, as its greatest weakness as a distributed system. "Its software makes it a small batch system," he declared.

There is no doubt that the German designers of the IBM 4331 at Böblingen conceived it

primarily as a conversational distributed processing system to be installed on new sites. Its mainframe design is that of a 32-bit mini, with the arithmetic and logic unit and up to eight input/output microprocessors sharing access to main memory via a 32-bit wide parallel bus.

This is an architecture that has proved itself on countless minis during the last decade as particularly efficient for event-driven real time processing, less so for batch processing.

IBM offers the fastest deliveries to 4331 customers who order the system in certain

standard configurations. These comprise three or four Model 3310 fixed disc drives (64 megabytes each), one or two Model 8809 magnetic tape drives, and variable numbers of local 3278-2 keydisplay terminals and 3287 serial or 3262 or 3289-4 line printers.

Two features of these standard configurations stand out: 1. They are complete configurations, which do not depend on any peripherals left behind from an earlier system for their backing storage, or their input and output.

Is the IBM 4331 just another entry level batch processing system like the 370/115 that it has replaced, or has it been designed primarily as a distributed processing satellite? This is a matter of some controversy both among IBM-watchers and IBM users. In this Marketview, Fred Lamond draws material from some of his Infotech lectures on the IBM 4300 Series, to discuss this question, as well as to compare the 4331 with some of the other systems proposed as distributed processing satellites, both from IBM and other manufacturers.

2. Neither the CPU nor any of the specified peripherals require more than the power supplies or air conditioning considered normal in an ordinary US office, as against the more demanding computer room requirements.

The latter feature is only an important sales point when the 4331 is destined to be installed on a new site, that has not previously seen a computer, or seen no more than a light magnetic ledger card processing office computer.

Within these 4331 standard configurations, the only input devices are: the system diskette, used for inputting the CPU's microprograms, and new releases of IBM systems software; and the keyboards of 3278-2 display terminals. The latter are primarily conversational input and transaction processing devices.

A mix of up to 15 VDUs, and serial or line printers may be connected to the 4331's integrated display/printer adapter by coaxial cables that may each be up to 1,500 metres long. This is long enough for VDUs and printers to be distributed among individual user offices and sites.

Whether a system is suitable for distributed transaction or conversational processing online to a larger host, or both, depends as much if not more on its systems software as on its hardware design.

IBM's systems products division has striven hard to endow not just the 4331 but the whole of the 4300 series with just those software facilities. It offers a choice of two operating systems for the series: DOS/VSE and VM/CMS.

DOS/VSE is the old DOS/VSE extended by the Advanced Functions (VSE/AF) program product that expands its multi-programming capability to 12 partitions and up to 208 tasks; and the Interactive Computing and Control Facility (VSE/ICCF), which converts every online VDU terminal into a subsidiary system console. From these applications programs can be selected from a screen menu and loaded, and both source programs and data entered online and validated interactively.

The alternative VM/370 operating system (Release 6) has been modified by its Basic Systems Extension (BSE/Release 2) to allow its built-in Conversational Monitor System, CMS, to be used directly for processing VSE/VSAM files in conversational or batch mode without loading an intermediate "guest" operating system, such as DOS/VSE or OS/VS 1, for the purpose.

In that way, VM with CMS and no other "guest" can be used on entry-level 4331s with only 512K-bytes of main memory, whereas at least one megabyte of main memory is required when VM/370 hosts another major operating system on the same hardware.

IBM recommends VM/CMS in preference to DOS/VSE for 4331s used on new end-user sites because the CMS command language uses plain English and appears more friendly to the user than the DOS/VSE job control language with its acronyms and abbreviations de-

signed for professional operators.

When 4331s are running under DOS/VSE they can be used as either hosts or satellites or both within both BSC and SNA data communications networks. To run within an SNA network, they require the ACF/VTAM-E program product that provides an integrated subset of no less than three separate program products on larger 434 and 370 models. These are: ACF/VTAM, the optional Multi-System Networking feature, and ACF/NCP/VS on 32 front-end processors.

Their integrated communications adapter allows 4331s to dispense with 3705 front end provided they require no more than eight communication lines to other hosts or satellites within the same network.

ACF/VTAM-E allows an IBM 4331 to be host to satellite 4310s, 8100s, 360 or 370 systems or some lines, while connected to other hosts by other lines. 4331s, connected locally or remotely to the 4331, can "pass through" their controlling C/I to interrogate and/or update interactively the files connected to any other host within the same network.

The "BSC Pass Through" program product will allow the 4331, and any other system running under DOS/VSE, to offer the same facility on BSC networks.

Similarly, the DOS/VSE

Whether a system is suitable for distributed transaction or conversational processing online to a larger host, or both, depends as much if not more on its systems software as on its hardware design

entry program allows any DOS/VSE system to be used as a remote job entry terminal under another IBM host running under DOS/VSE, OS/VS 1 or MVS. The host runs under DOS/VSE its job entry program communicates with VSE/POWER on the host; if under OS/VS 1 or MVS, with JES 2 or JES 3.

When 4331 satellites are running under VM/CMS without guest operating system they are present only control lines. Within BSC networks, however, VM Interactive File Sharing (VM/IFS) allows VSAM files held on disc to be shared either by several "guest machines" on the same processor, or by several processors connected in a network.

The Remote Spooling Communications Subsystem for processing (RSCS/Networking) allows 4331 and other compatible systems to be used as spooler nodes within a network for passing remote job and data messages and data from remote terminal systems to other remote hosts, also running under VM/370 and RSCS.

Any user evaluating the 4331 shortly after its first commercial deliveries began in 1979 would have been able to run only under DOS/VSE, and thus found himself

Manufacturer	Model	Main memory capacity (bytes)		Local Programming Languages							Other communications protocols			
		Minimum	Maximum	Cobol	RPGII	PL/I	Fortran	Basic	APL	Pascal	SDLC	X25	CDC UT200	Univac 1004
IBM	4331	512 K	1 M	X	X	X	X	X	X		X			
	8140	256 K	1 M	X			X				X			
Data Processing Division	Series/1	16K	256K	X	X	X	X	X			X			
	System/34	32K	256K	X	X	X	X	X			X			
Magnuson	M 80	1 M	8 M	X	X	X	X	X	X		X			
	Nord-100	64 K	32 M	X	X	X	X	X		X				
Norsk Data	50 series	512 K	8 M	X	X	X	X	X			X		X	X
	Prime													
Digital Equipment	PDP-11 series	128 K	3.8M	X	X	X	X	X	X	X	X	X	X	X
	Modcomp	128 K	2 M	X	X	X	X	X			X		X	X
Univac	V 77	128 K	2 M	X	X	X	X	X		X			X	X
	Eclipse	64 K	2 M	X	X	X	X	X			X		X	X
Data General														
	Texas													
Instrument	DS 990 series	128 K	2 M	X	X		X	X		X	X	X		

From page 14

only "a small system" in Larry Woods' words.

But even when all the DOS/VSE and VM/370 Release 6 products and System I/PO/Es become available, and the IBM 4331 can then be used as a distributed processing satellite, it does not follow that it will then be the most cost-effective or attractive distributed processing satellite on the market, even for 370 or compatible host computer users.

The smallest 512K-byte 4331 standard configuration with three 3310 discs able to run under VM/CMS costs about £75,000 for the hardware alone.

A 4331 able to fit into an SNA network would have to be equipped with at least 1 megabyte of main memory, four 3310 discs, an integrated communications adapter, run under DOS/VSE and ACF/VTAM-E, and cost over £120,000 for the hardware and over £400 a month for the systems software.

Yet, as Table 1 shows, there are at least 10 other systems available on the market, that can offer both IBM 3270 and 2780 or

Hasp terminal emulators on basic configurations with as little as 32K to 512K-bytes of main memory, and costing no more than £20,000 to £45,000, between a fifth and less than half of the cost of a basic 4331 online satellite configuration.

Three of these rival satellite systems do indeed come from IBM itself: the Data Processing Division's 8140, available for £48,000 for a 256K-byte basic system, and the General Systems Division's Series 1 and

Table 1. Business minicomputers offering IBM 3270 and 2780 or HASP terminal emulators

## Three rival satellite systems from IBM

System 34, available at basic configuration prices of £22,000 and £34,000 respectively. Of these, only the 8140 is expandable to the 4331's range of main memory sizes and it offers a much narrower choice of local programming languages.

The seven competing systems offered by minicomputer manufacturers, on the other hand, offer much cheaper basic configurations than the 4331, expandability well beyond the 4331's maximum 1-megabyte main memory, and a choice of local programming languages that is almost as broad as the 4331's.

All offer at least Cobol, RPG II, Fortran and Basic. While only Prime and Data General offer also PL/I compilers, and only Digital Equipment an APL interpreter, Norsk Data, DEC, Univac and Texas Instruments offer also a Pascal compiler that is not yet available on the IBM 370 and 4300 series.

All the systems listed on Table 1 can fit into a BSC network and offer both IBM 3270 emulators for interactive file inquiries and IBM 2780 or Hasp workstation emulators.

Only the IBM, Modcomp and Texas Instruments systems offer also the IBM SDLC protocol for SNA networks, but the others offer instead the CCITT-approved X25 version of HDLC, which allows them to communicate both with IBM and other manufacturers' host computers via a PTT packet-switching network, a more useful feature in Europe at least during the 1980s.

Norsk Data, Prime, DEC, Modcomp and Univac offer also emulators for CDC UT 200 and Univac 1004 terminals, in addition to their IBM terminal emulators. Norsk Data offers also emulators for the Honeywell VIP (Interactive) and GERTS-115 (remote job entry) terminals. None of these are available on any IBM system.

What has the IBM 4331 to offer as a satellite beyond the facilities also available on these rival systems that could justify its much higher entry level price? Only one feature, and that is the ability to run under the same DOS/VSE, VM/370 or OS/VS 1 operating systems as a larger 370 host, and thus to be able to run locally cascaded

programs originally written for the larger host system without any prior modification to the source program, not even its JCL commands.

But how useful a feature is this? Most programs originally written for a larger host system, but small enough to fit on a 512K or 1-megabyte 4331, will originally have been written as batch processing programs. In order to run without any source program modification on the 4331 satellite, they would also have to run in batch mode, and this would require putting expensive professional operators on the satellite site, which is not at all in line with the aim of making these new satellites "user friendly."

If the cascaded programs are on the contrary to be run fully interactively on the satellite system, some modification in at least their JCL commands will be essential; in which case, it

would hardly cost any more to rewrite their JCL commands to the standard of operating systems of any of the much cheaper satellite systems listed in Table 1, provided these offer a version of the same high-level language in which the source program was originally written.

Even in its ability to run unmodified programs cascaded from a larger host, the IBM 4331 is outstaged by the Magnuson M80. The smallest M80/32 1-megabyte configuration costs about 20% more than a 1-megabyte 4331 and would require computer room air conditioning to handle its STC discs, but it is also much more field-expandable.

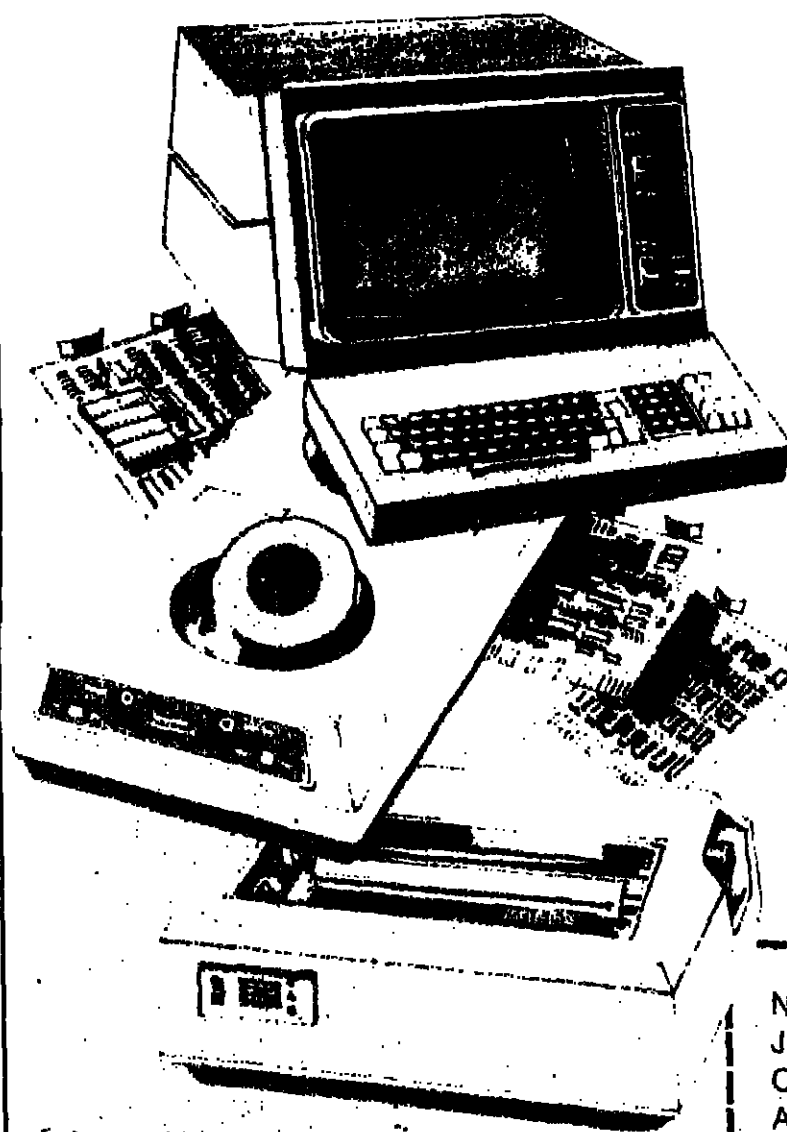
The CPU can be expanded to M80/42 or M80/43 specifications that offer performance comparable to the IBM 4341, and memories expandable to 16 megabytes. On any system with at least 4 megabytes of main memory, Magnuson is prepared to support not only all the same IBM operating systems as on the 4300 series, but also MVS, which IBM does not offer currently on any 4300 model.

\*The IBM 4300 Series: an Independent Assessment, 12 lecture course by Fred Lamond at Kensington Exhibition Centre, London, 27-29 February 1980. Details from Infotech International Ltd, Nicholson House, Maidenhead, Tel: 0624-35031.

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Many other systems, such as the Magnuson M80 seen here, offer IBM 3270, 2780 and HASP emulation or both configurations at a lower cost than the 4331.

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## COMPANY NEWS

## Cash-hit Compelec seeks a partner

A CASH-FLOW crisis has hit Compelec, the UK's first microcomputer dealer, and the company is now actively seeking a partner. Though it is "definitely solvent", according to managing director Roderick Versluys, Compelec is suffering the growing pains of a rapidly expanding order book and a shortage of cash to finance the growth.

## Racal-Redac record growth

RECORD growth in 1979 was reported by Racal-Redac, whose £8.5 million sales of CAD systems represented more than double the orders for 1978.

The West German subsidiary topped the orders list with sales of CAD systems and the Executive business system worth about £3.7 million. It was followed by the UK with nearly £1.1 million, the US with £1.1 million and the newly-formed French subsidiary with £330,000.

New subsidiaries in Sweden and London are to be formed.

According to Versluys, the current order book stands at about £1.3 million, and the company should hit sales of £3 million by the end of the year. Both debtor and creditor totals were substantial, he said.

"We are looking for an investor at the moment. There have been several offers, but none yet with a deal that we like," he said.

"A majority shareholding is possible, but we would want to retain operating control of the company. Some of the offers we have received just want to cut away and keep the good bits of the company."

He claimed that there was no shortage of business, saying: "Our systems are selling like hot cakes."

Compelec started life as a dealer for the Altair microcomputer, under the aegis of Martin Underwood. Following his departure, the company moved away from the hobbyist market and towards the small business area.

It now specialises in its own Compelec Series 1 microcomputer, based on the US-manufactured Altos system. It also sells a dedicated word processing system which is called Simplex.

## Share split 'will benefit small man'

ICL shares started to be quoted at about one quarter their previous value on February 11 following the acceptance by shareholders of the share split at ICL's annual meeting the week before.

The split was recommended by ICL when it announced its 1979 financial results last week (Christmas CW, December 20/27, 1979). ICL believes that the split will make its shares more attractive to the smaller investor.

The nominal value of each ICL share is now 20p instead of £1, but existing shareholders have lost nothing because they now have four times as many shares.

The change in the value of ICL shares on the Stock Exchange can be seen from our share table at the bottom of the page.

## ICL reaches top 10 in computer sales league

THE French paper Ordinateurs has compiled a table of the Top Fifty companies in the DP business, listed according to the estimated turnover of their computer operations. IBM's typewriter and copier businesses are excluded. The Top Twenty, with turnover in millions of dollars for 1979 is as shown in Table 1 below.

The figures should not be taken as exact, because they have been converted from various original currencies into French francs and thence back

into dollars. Some companies with various interests are also less open than others about the division of their business between various sectors.

If Honeywell and CII-Honeywell Bull are taken together, they occupy third place.

Apart from ICL, no UK company is in the Top Fifty, but Ferranti's computer interests could put it just outside the table, very close to Centronics which is bottom of the list.

Firm	\$m
1 IBM	18,514
2 NCR	2,006
3 Burroughs	2,388
4 Univac	2,288
5 Control Data	2,185
6 Digital Equipment	1,986
7 Fujitsu	1,553
8 Honeywell	1,480
9 ICL	1,410
10 CII-Honeywell Bull	1,209
11 Olivetti	1,138
12 Siemens	1,100
13 Hitachi	987
14 Hewlett-Packard	955
15 NEC	884
16 Memorex	872
17 Nixdorf	869
18 TRW	559
19 Data General	534
20 Philips	485

Table 1

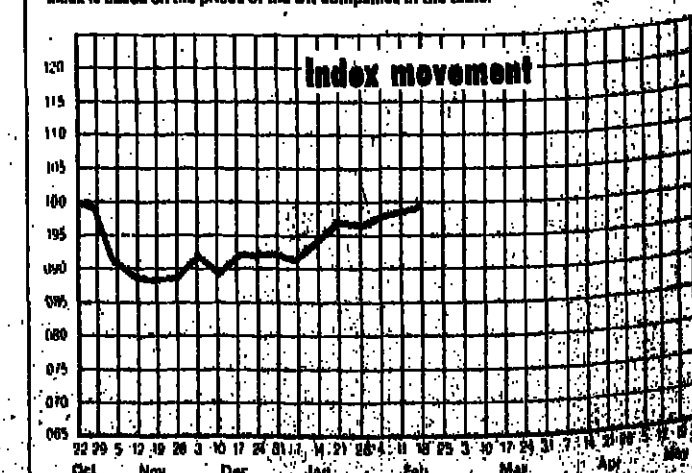
## £24m CMC orders

CMC UK notched up orders worth £24 million in 1979, including £4 million of business overseas. CMC's two main products are its Sovereign multiple processor keying system and the Reality Royale small business computer.

## CW SHARES TABLE

Date 18/2/80		Index 88.64		Change 12.10	
Price	Stock	Price	Stock	Price	Stock
1980	Low	1980	Low	1980	Low
375	250	375	250	375	250
42	38	42	38	42	38
131	131	131	131	131	131
78	70	78	70	78	70
120	115	120	115	120	115
86	80	86	80	86	80
830	840	830	840	830	840
120	122	120	122	120	122
180	188	180	188	180	188
500	40	500	40	500	40
375	250	375	250	375	250
139	135	139	135	139	135
151	150	151	150	151	150
135	115	135	115	135	115
17	8	17	8	17	8
72	200	72	200	72	200
726	271	726	271	726	271
210	202	210	202	210	202
1108	682	1108	682	1108	682
152	132	152	132	152	132
160	160	160	160	160	160
141	108	141	108	141	108
228	180	228	180	228	180
81	72	81	72	81	72
221	221	221	221	221	221
121	117	121	117	121	117
128	121	128	121	128	121
121	117	121	117	121	117
128	121	128	121	128	121

The table shows the closing prices in London and New York at the end of last week. The index is based on the prices of the UK companies in the table.



## COMMENT

CONTROLLED growth is the aim of the game in the computer business and when tight control over staff and expenditure is not applied by management a firm operating even in a booming marketplace can go to the wall.

Last year saw Nottingham systems house, Gamma go into receivership even though it had orders in hand and the best brought back memories of its Business Computers' crash six years ago. In both cases the pitfalls were not hardware but software.

At the same time it seems fairly clear that the refusal by Digital Equipment late last year to supply Gamma with any more kit was simply the result of Gamma's financial position and not its cause.

The demise of Gamma is not a blow for its shareholders, employees and, in some cases, creditors. It will also adversely affect the credibility of other systems houses and could persuade some potential purchasers of small business machines to play safe and buy from one of the big computer manufacturers like IBM and ICL.

This would be a great pity, because many systems houses in the same business as Gamma are run at very tight ships, especially some of the smaller ones. They avoid getting into serious debt with DEC or whoever else supplies them with hardware on an OEM basis, and they keep a close control over the quality of their programming staff.

## PRODUCT NOTES

## UK launch for bar code equipment

INTERMEC bar code equipment, made by Interface Mechanisms, is now available in the UK from Sintrom-Ellinor. A bar code reader used in conjunction with Intermec's hand-held ruby wand light pen allows variable length bar code messages of up to 32 characters to be scanned at speeds from three to 50 inches per second, says Sintrom-Ellinor. Output from the reader is serial RS 232C at standard rates in the range 110 to 9,600 baud. Operation is full or half duplex and dual port connectors permit the reader to be connected in tandem with online terminals.

Complementing the reader is the Series 8100 bar code printer comprising an impact printer and keyboard. Data entry is either serial RS 232C or direct from the keyboard.

Software options include incrementing, check digits and landfills. A further option is a label applicator which facilitates the automatic application of bar coded labels in computer controlled conveyor systems, says Sintrom-Ellinor.

The Model 9153 multiplexer facilitates the connection of up to 16 Intermec readers and associated terminals to a single mainframe. It can be connected up to 2,000 feet away from the readers.

Sintrom-Ellinor Ltd (CW), 14 Arkwright Road, Reading, RG2 0LS. Tel: 0734 85464.

## Low cost colour plotter

THE Colorplot 100 is available from Pragma at a one-off end-user price of £5,783. It provides low cost colour printing of quality, said to be comparable with ink jet or xerographic methods of reproduction.

Using raster matrix impact technology and a Trilog three-colour ribbon, the Colorplot 100 provides multicolour or monochrome copies on plain or fan-fold paper ranging from four to 16 inches wide. It will accept inputs from ASCII parallel devices.

The bi-directional drive system gives registration quoted as  $\pm 0.005$  inches and asynchronous plotting allows colours to be printed in any order, says Pragma.

Pragma Ltd (CW), Middlesex House, 29 High Street, Edgware, Middlesex. Tel: 01-852 8471.

## Up to 20 megabytes per drive for word processing systems

CAPACITIES of up to 20 megabytes per drive are provided by the Series 7000 Winchester disc drive from Kennedy. The 7000 is an 8-inch drive and is intended for use with small business or word processing systems.

The 7000 can have one, two or three platters, the bottom surface of one holding pre-recorded servo tracks for positioning the read/write heads. The other surfaces have unfurrowed capacities of four megabytes each so that the capacities of the one, two and three platter models are four, 12 and 20 megabytes, respectively.

## Acoustic silencer

AN ACOUSTIC silencer has been introduced by Power Equipment for Xerox 880 KSR word processing keyboard printers. The makers claim a noise reduction down to 67 dBA. The silencer is an enclosure consisting of a base, which fits beneath the Xerox 880, and a sound absorbing top section which matches the machine's contours.

A small fan is built in to keep the printer cool. The Power Equipment Co Ltd (CW), Kingsbury Works, Kingsbury Road, London, NW9 8UJ. Tel: 01-208 0033.

## Desk top data capture unit

MANY different types of data can be captured using the Model 1011 Transactor from International Data Automation. Transactor is a desk top unit that can operate as a V24 terminal as well as providing local functions like recording data on magnetic tape cassette and printing a paper tape journal and cash receipts.

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The Transactor's application areas include point of sale, banks, hospitals, libraries and factories, and the unit costs under £1,500.

International Data Automation Ltd (CW), 170 Outlands Drive, Weybridge KT13 9ET. Tel: 0253 54364.

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The Milton Ross Co Ltd (CW), 175-193 Rickmansworth Road, Watford, WD1 7JH. Tel: Watford (02) 24446.

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It is available with an optional printer port to provide print-outs along with the read-outs, green phosphor screen, polling,

synchronous communications, video output, additional character sets and line drawing set. Peripheral Hardware Ltd (CW), Armfield Close, West Molesey, Surrey. Tel: 01-841 4806.

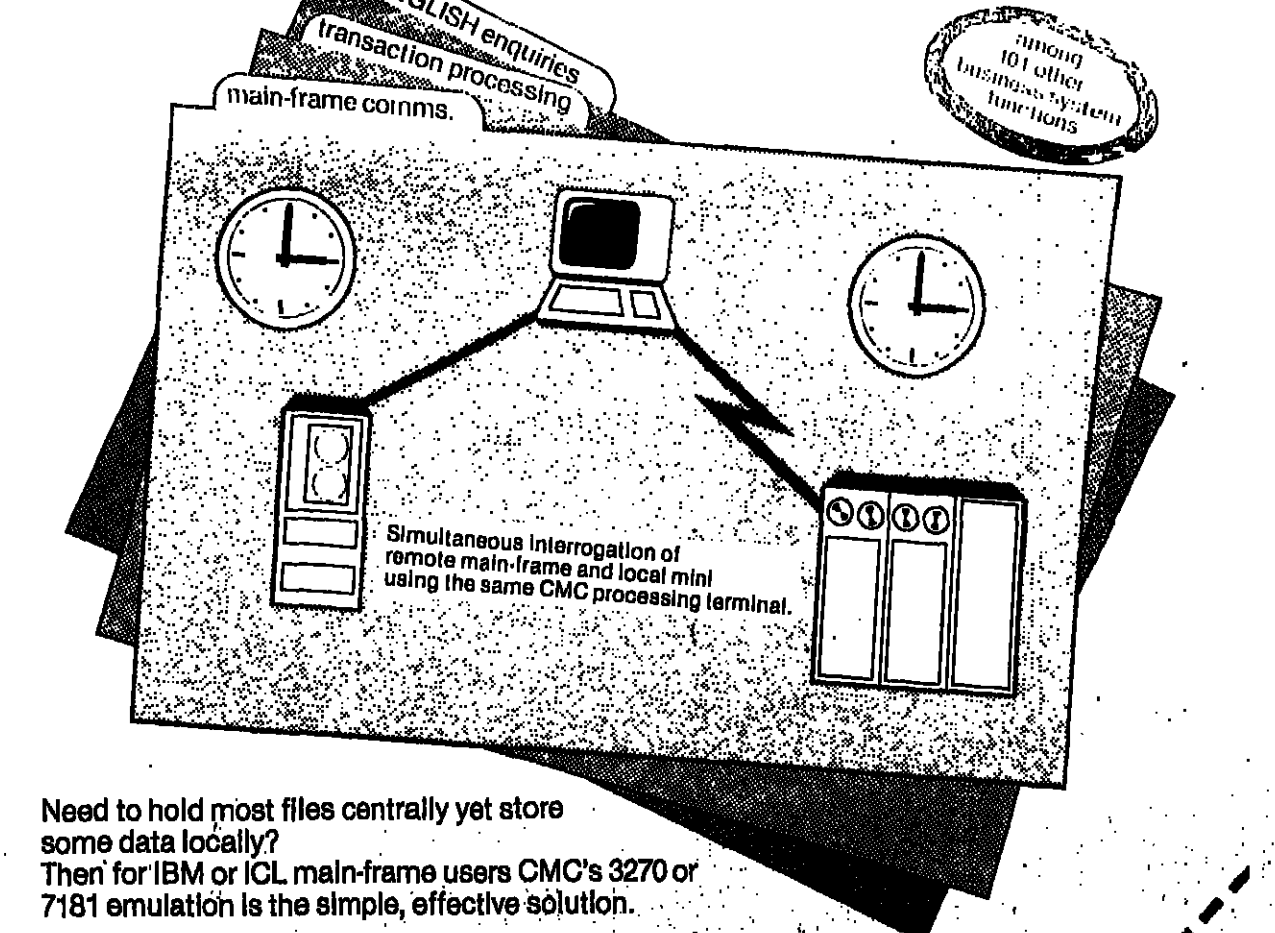
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Hays Business Services Ltd (CW), Datasafe House, 22 Vine Lane, London, SE1 2JW. Tel: 01-403 2033.

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## ADVANCED FILE DESIGN—Part 3

## Sequential files—tape or disc

BLOCKING FACTOR	AVERAGE NUMBER OF ACTIVE RECORDS PER BLOCK	% OF RECORDS THAT MUST BE READ
1	.01	1
3	.03	3
10	.10	9.5
30	.30	26
100	1.0	63.2
300	3.0	95
1000	10.0	100

Table 1. These figures are calculated on the assumption that accesses are randomly distributed.

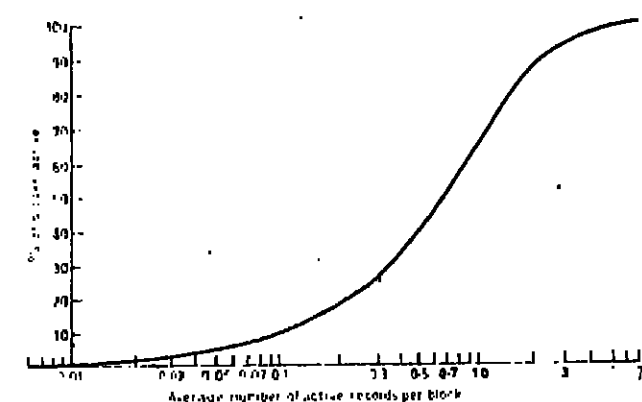


Diagram 1. This graph illustrates that as the blocking factor increases more unwanted data has to be read.

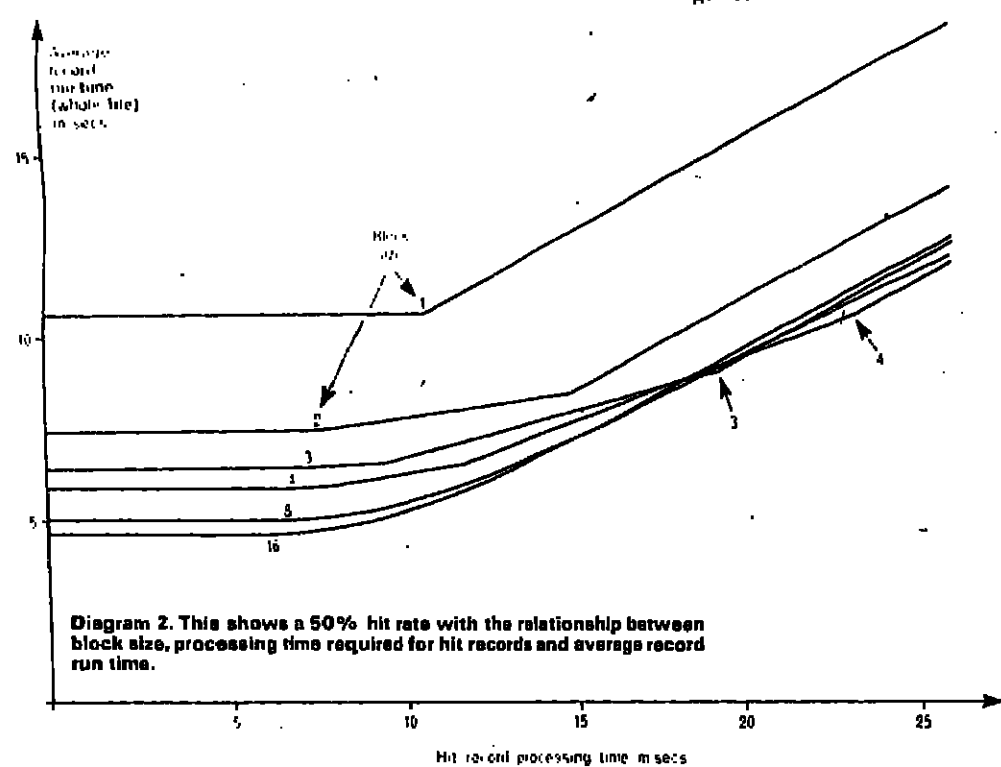


Diagram 2. This shows a 50% hit rate with the relationship between block size, processing time required for hit records and average record run time.

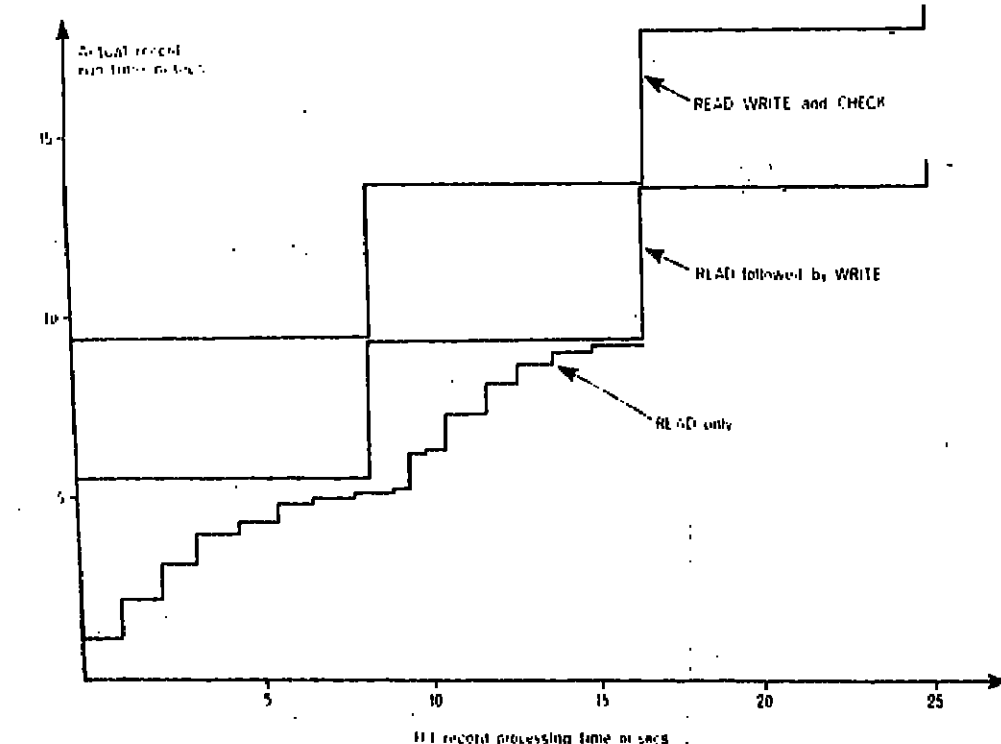


Diagram 3. The relationship between average record run times and hit record processing time on an IBM 3330 when a 50% hit-rate is achieved.

IN previous parts we have looked at the cases for which magnetic tape is the obvious choice, or disc is clearly indicated. The file designer is usually in a more difficult position when hit-rate is relatively low, but high enough to leave some doubt.

Estimating timings on magnetic tape does not present much difficulty. Every record has to be read, and savings can be made only by correct blocking, changes in batching or file sectioning. These were dealt with in Part 1.

Estimating timings on disc is more complicated. Generally, it is only if the separate key format is available that sequential disc files will be faster than sequential tape. If the sector mode of operation is used, an indexed file will be needed to provide skip-sequential processing, in which unwanted records are scanned and rejected as the disc rotates. As the examination of every record will lead to the loss of many revolutions of the disc, only very low hit-rates, perhaps 2% to 5% of all blocks, will justify a sequential file on sector organised discs.

The rest of this discussion will concentrate on comparing tapes with discs for which the separate key format is available.

On a disc, timing will depend on a number of factors. The first of these is a combination of hit-rate and blocking factor. This is discussed in Basic File Design; from which Table 1 and Diagram 1 are taken. From these it is clear that, as the size of blocks increases, more and more of the records have to be read, whether they are required or not.

The next important influence on timing is the type of access. This is shown in Table 2.

The loss of full revolutions will lead to very much slower processing than is required to access records for a single read or write; hence, the balance of decision between disc and tape will depend very much on the processing required.

For any given installation, the characteristics of the discs and tapes available will determine break-even points. These will be affected by the operation of manufacturers' software, and this is sometimes decisive. ICL 1900 series sequential files on disc could only read one record on a single track revolution, for example. However, software can be modified by writing user routines in physical IOCS (PERI routines for the 1900 series, PPOCS for IBM 360/370), so it is still worth comparing the potential differences between tape and disc.

A tape of the following characteristics has been examined: rated transfer rate, 150,000 bytes per second; packing density, 1600 bytes per inch; start/stop time, 6.4 milliseconds; inter-block gap, 0.6 inches.

This tape will have effective transfer rates for a number of block sizes as shown in Table 3.

It is useful to note how, for small blocks, the effective transfer rate is much lower than the rated one. This is reflected in Diagram 2, which shows, for a 50% hit-rate, the relationship between block size, the processing time required for hit records and the average record run time for the complete file.

The shape of these curves demonstrates that small block sizes, one or two records in this case, never give as good results as larger blocks. However, for some rather long record processing times, intermediate sized blocks can outperform large ones. The arrowed points in Diagram 2 show where 3 and 4 record blocks give particularly good results.

This should not obscure the usual situation, which is that for typical record processing times, and for lower hit-rates, large blocks always provide the shortest average record processing time.

Manufacturers' software may not yield results precisely like these, and average record run times will generally be higher. However, the potential is there to be exploited.

As explained earlier, disc results depend on the mode of access required. The relationship between average record run time and hit record processing time is shown for the 50% hit-rate case on a 3330 in Diagram 3.

The characteristically "stepped" curves are due to lost revolutions. Once more, the curves show a potential situation that is not realised by many of the available software packages. Average record run times are

by Owen Hanson and Norman Revell

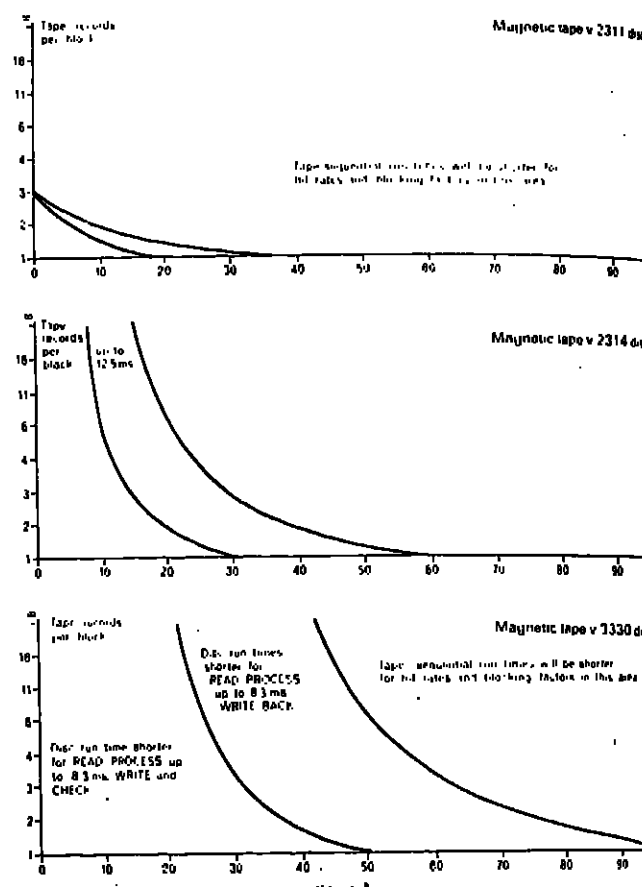


Diagram 4. These curves represent the potential break-even points for tapes and discs on various types of drive.

ACCESS TYPE	DELAY
READ or WRITE only	No automatic delay
READ followed by WRITE or WRITE followed by CHECK	At least ONE lost revolution
READ followed by WRITE followed by CHECK	At least TWO lost revolutions

Block Size (records)	Effective Transfer Rate (bytes per second)
1	60,000
2	86,700
4	102,150
8	108,000
16	126,300
	137,000

Table 3. Block sizes much higher than this due to the loss of revolutions as a result of software written without consideration of the way discs operate.

Combining these, and many other curves for different block sizes and hit-rates it is possible to produce curves such as those shown in Diagram 4. These represent the potential break-even points between disc and tape for the tape stated above, and IBM's 2311, 2314 and 3330. These relatively slow discs have been chosen because their transfer rates start at about that of the tape.

## CONFERENCES

## Friend or enemy?

Computers — the small company's friend or enemy? is the question posed at a conference to be held at the Piccadilly Hotel, London on March 6. Organised by the British Production and Inventory Control Society, the objectives of the seminar are to introduce the potential first-time user of existing user who wishes to install production and inventory control systems to the range of systems and equipment which is now available, and offer practical advice and guidance on how to choose and install such systems.

The International conference on APL, organised by the Leyden University Computing Centre, will take place from June 24-27, in the Leuvenhorst Congress Centre, Noordwijkerhout, near Leyden in Holland. APL80 deals with all aspects of the programming language APL. Details

from APL80 Registration, c/o Box 5012, 2300 RA Leyden, Holland.

Liverpool University's computer laboratory in association with the Journal of Microcomputer Applications, will hold a two-day seminar on March 31 to April 1. For information from C. Brown, Computer Processor Workshop, University Laboratory, Liverpool PO Box 147, Liverpool.

The Artificial Intelligence Society (AISB) is to hold a meeting on the simulation of behaviour. Details of these systems will be given at the meeting. For information from the AISB, contact the AISB, Department of Computer Science, Leeds University, Leeds, LS2 9JT.

## BASIC FILE DESIGN

A new impression of Basic File Design will be available in March and copies may be ordered from the General Sales Manager, IPC Electrical Ltd, Electronic Press Ltd, Dorset House, Stamford Street, London SE1 9LU. Price £1.95 each including postage.

## BOOKS

## Minimising security risks in large installations

Computer Security and Protection Structures, by Bruce Walker and Ian Blake. Dowden, Hutchinson & Ross Inc.

THE security of a computer installation — equipment, personnel, software, data — is never an exciting subject. Indeed, to the busy DP manager it is positively boring. It is one of those areas, like insurance, which is never a priority, yet is always vaguely worrying.

Everyone knows that the loss of a

computer room could be disastrous, yet the majority of installations are not adequately protected.

There is an urgent requirement for readable books which provide check lists and advice on how to minimise the risks within an installation and maximise the opportunities for continuing service if some losses do occur, accidentally or otherwise.

It would seem then that almost any book in this general subject area would

be welcomed. The book under review claims to contain "a complete survey of the applicable literature on computer security" although "only a very scant discussion is made concerning the problem of privacy".

The main text is divided into three parts: threats, counter-measures, and survey of implemented systems. This is followed by an extensive bibliography which covers 17 pages and contains over 180 entries. Most references are

American and are rather dated.

The book is really only concerned with large installations. Terminals are briefly discussed but small installations, minis and micros are ignored.

Part one is a brief introduction and part two is the main part of the book. It skims briefly over such matters as physical security and insurance but is mainly concerned with the design of large operating systems.

Part three deals almost exclusively

with large and out-dated IBM and Honeywell software systems.

The text is irritating to read since virtually every paragraph contains references to books, projects, papers, people, machines and software systems, which serve to confuse rather than enlighten the general reader.

No doubt it will be useful as a source of reference in places of learning and research establishments.

PHILIP RULE

## Access to a Lisp system is needed

Techniques of Artificial Intelligence, by Stuart Shapiro. £8.70, 185 pp. Van Nostrand Reinhold Co Ltd (CW), Molly Millars Lane, Wokingham, Berkshire. Tel: 0734 789456.

A FUNDAMENTAL requirement in Artificial Intelligence is that all systems are designed with their implementation as computer programs (or their hardware equivalent) in mind.

Some people find Artificial Intelligence ideas vague unless they are shown specific programs implementing those ideas. That is the motivation of this book.

It is not intended as another textbook of Artificial Intelligence; it is to be a supplement to existing textbooks. As such it is not self-contained; it makes constant reference to other sources.

The terminology used and some of the algorithms are not explained, but assumed known to the readers. In fact, the whole book looks like program listings with interspersed comments.

Reading is difficult although, to be fair, this is partly to do with the reviewer's lack of fluency in the languages used (mostly Lisp, a little Microplaner and Snobol). Lisp is the accepted language for Artificial Intel-

ligence in the US but, due to the tendency of Lisp systems to be large, is less widely used among Artificial Intelligence workers in this country.

On closer examination, we find that most of the programs in the book do not actually make use of the one property of Lisp (together with Snobol and APL) that makes it superior to other programming languages: the uniform representation of program and data.

Thus most of the programs could have been written, more clearly in our view, in a Pascal-like language, and that would have made the book useful to many people outside the Artificial Intelligence community.

The choice of example programs is very good, if not representative of current trends in Artificial Intelligence, where the emphasis is on knowledge engineering, rule-based systems and so on.

The examples include A\* algorithm, AND/OR trees, backtracking (using Microplaner's automatic backtracking facility), alpha-beta pruning, and Wang's algorithm for propositional calculus.

The book is an excellent collection of example programs in Artificial Intelligence, but of

## Broader treatment of finite elements

Techniques of Finite Elements, by Bruce Irons and Sohrab Ahmed. £26.50, Ellis Horwood Ltd (CW), Market Cross House, Cooper Street, Chichester, West Sussex. Tel: 0243 789942.

THE authors of this book have long and distinguished records of finite element work, both in industry and at universities (most notably at Swansea) and this large and comprehensive work reflects the breadth and depth of their experience.

It is not an elementary or introductory text; it is less formal and more discursive than most books on the subject, being rather like a series of informal lectures at post-graduate level. It does assume some previous experience of finite elements.

The techniques presented are related primarily to the static, linear analysis of structures, although the fundamental principles are presented in general dynamics, non-linearly and non-structural applications.

The authors' practical and pragmatic approach comes across clearly, and the book includes much down-to-earth advice on selection of elements, programming matters, the organisation and management of finite element work, and other aspects of solving real problems.

The authors consistently emphasise the relationship bet-

ween the mathematical formulation and the physical behaviour which it implies. This emphasis makes the sections on plate bending and shell elements particularly good, but it illuminates all the theoretical discussion.

Numerical methods and computing techniques are discussed in parallel with the matrix-structural theory. A listing and some documentation for a frontal solution package with sub-routines for Semicoef beam and shell elements is included. This is in Fortran IV with no obnoxious machine-dependent features.

The authors practise what they preach — the package includes comprehensive error diagnostics.

A lot of the purely mathematical work is confined to a 90-page section which forms a useful compendium of numerical algorithms. The bibliography contains 124 references with comments on their relevance and content of many of them.

There are exercises for the reader throughout the text, some of mind-bending difficulty, but the authors give solutions for most of them.

The book can be recommended to readers with some finite element experience who wish to broaden their understanding of the subject.

DAVID GILBERT

## Very much a basic textbook

Computers in business, by Peter Haine and Ernest Haddon. £10 (hardback) £4.95 (paperback). Macmillan Press Ltd (CW), 4 Little Essex Street, London, WC2. Tel: 01-836 6633.

ANYONE reading "Computers in business" in the hope of picking up helpful advice on computerised payroll, VAT or even the electronic office, could well be disappointed.

The book is very much a basic text book for the business

student and graduate and is, in the best current tradition, based on the BEC/TEC computing study modules.

Each chapter has its full quota of set exercises, discussion topics and exercises. One prime discussion point could well be directed back at the academic editors and authors.

Compare and contrast the real life salaries of highly skilled DP personnel with those quoted in the book, which range from £3,500 to £8,000.

Similarly a book published in 1967 on real time computer systems is given a recommended reading. Has technology therefore not made any major advance in 13 years?


As a computer application and approach primer, the book is most informative and could well benefit many practicing DP personnel. Just how they would deal with the exercises, however, would make an interesting follow-up edition.

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## ADVANCED FILE DESIGN—Part 3

## Sequential files—tape or disc

BLOCKING FACTOR	AVERAGE NUMBER OF ACTIVE RECORDS PER BLOCK	% OF RECORDS THAT MUST BE READ
1	.01	1
3	.03	3
10	.10	9.5
30	.30	26
100	1.0	63.2
300	3.0	95
1000	10.0	100

Table 1. These figures are calculated on the assumption that accesses are randomly distributed.

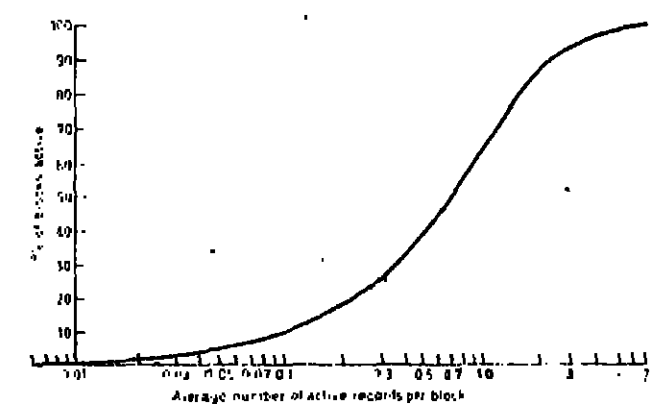


Diagram 1. This graph illustrates that as the blocking factor increases more unwanted data has to be read.

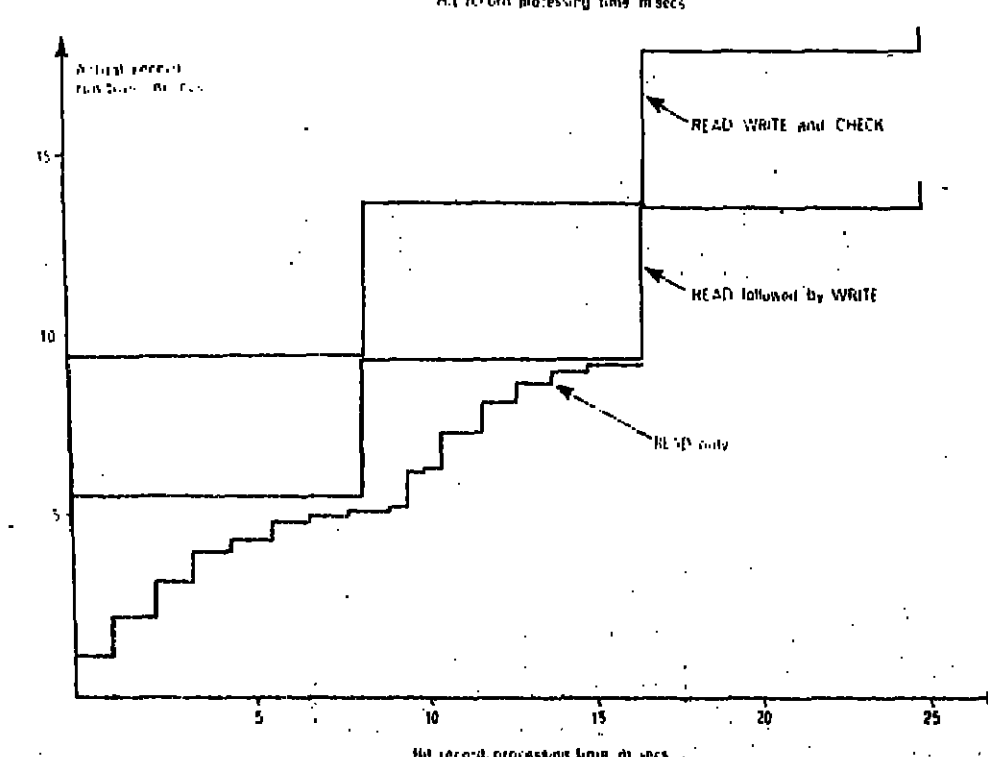
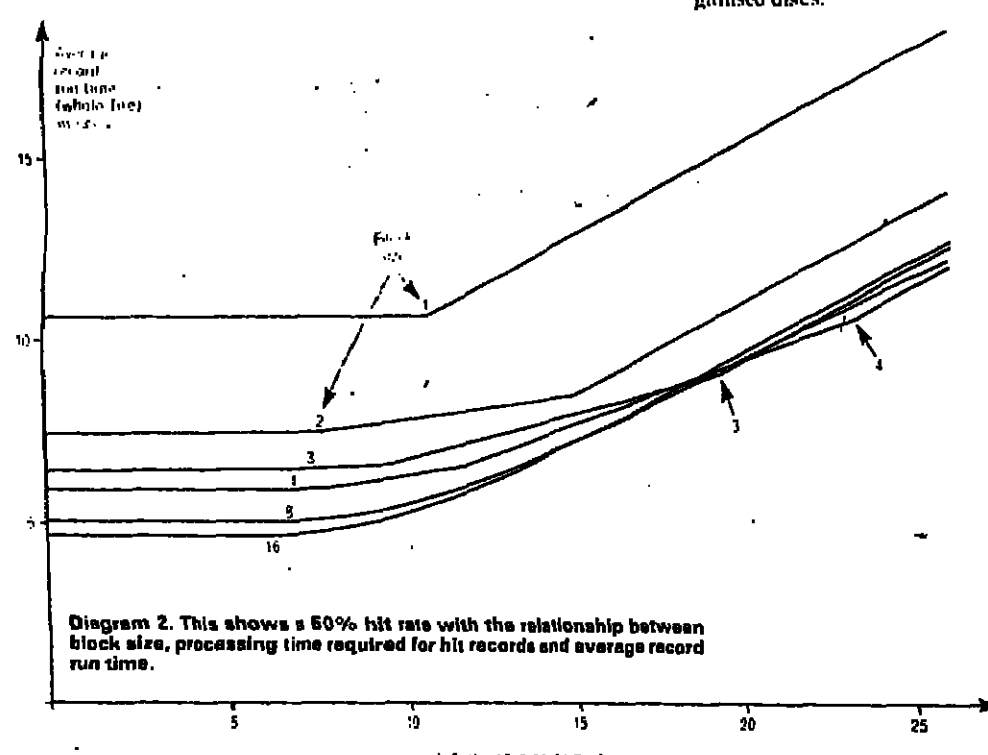


Diagram 3. The relationship between average record run times and hit record processing time on an IBM 3330 when a 50% hit rate is achieved.

In previous parts we have looked at the cases for which magnetic tape is the obvious choice, or disc is clearly indicated. The file designer is usually in a more difficult position when hit-rate is relatively low, but high enough to leave some doubt.

Estimating timings on magnetic tape does not present much difficulty. Every record has to be read, and savings can be made only by correct blocking, changes in batching or file sectioning. These were dealt with in Part 1.

Estimating timings on disc is more complicated. Generally, it is only if the separate key format is available that sequential disc files will be faster than sequential tape. If the sector mode of operation is used, an indexed file will be needed to provide skip-sequential processing, in which unwanted records are scanned and rejected as the disc rotates. As the examination of every record will lead to the loss of many revolutions of the disc, only very low hit-rates, perhaps 2% to 5% of all blocks, will justify a sequential file on sector-organised discs.

The rest of this discussion will concentrate on comparing tapes with discs for which the separate key format is available.

On a disc, timing will depend on a number of factors. The first of these is a combination of hit-rate and blocking factor. This is discussed in *Basic File Design*, from which Table 1 and Diagram 1 are taken. From these it is clear that, as the size of blocks increases, more and more of the records have to be read, whether they are required or not.

The next important influence on timing is the type of access. This is shown in Table 2.

The loss of full revolutions will lead to very much slower processing than is required to access records for a single read or write; hence, the balance of decision between disc and tape will depend very much on the processing required.

For any given installation, the characteristics of the discs and tapes available will determine break-even points. These will be affected by the operation of manufacturers' software, and this is sometimes decisive. ICL 1900 series sequential files on disc could only read one record on a single track revolution, for example. However, software can be modified by writing user routines in physical I/OCS (PERI routines for the 1900 series, P/OCS for IBM 360/370), so it is still worth comparing the potential differences between tape and disc.

A tape of the following characteristics has been examined: rated transfer rate, 150,000 bytes per second; packing density, 1600 bytes per inch; start/stop time, 6.4 milliseconds; inter-block gap, 0.6 inches.

This tape will have effective transfer rates for a number of block sizes as shown in Table 3.

It is useful to note how, for small blocks, the effective transfer rate is much lower than the rated one. This is reflected in Diagram 2, which shows, for a 50% hit-rate, the relationship between block size, the processing time required for hit records and the average record run time for the complete file.

The shape of these curves demonstrates that small block sizes, one or two records in this case, never give as good results as larger blocks. However, for some rather long record processing times, intermediate sized blocks can outperform large ones. The arrowed points in Diagram 2 show where 3 and 4 record blocks give particularly good results.

This should not obscure the usual situation, which is that for typical record processing times, and for lower hit-rates, large blocks always provide the shortest average record processing time.

Manufacturers' software may not yield results precisely like these, and average record run times will generally be higher. However, the potential is there to be exploited.

As explained earlier, disc results depend on the mode of access required. The relationship between average record run time and hit record processing time is shown for the 50% hit-rate case on a 3330 in Diagram 3. The characteristically 'stepped' curves are due to lost revolutions. Once more, the curves show a potential situation that is not realised by many of the available software packages. Average record run times are

by Owen Hanson and Norman Revell

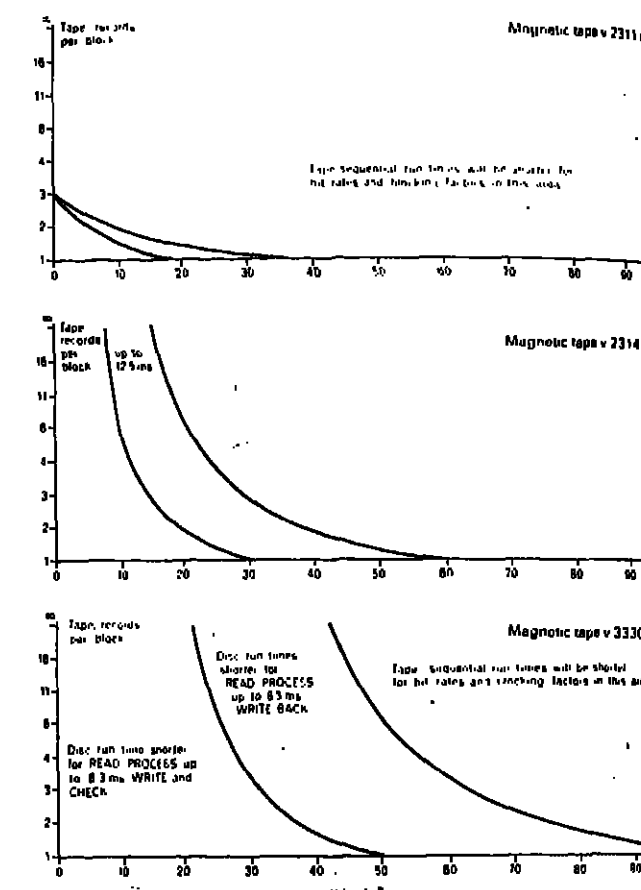


Diagram 4. These curves represent the potential break-even points for discs and tapes on various types of drive.

ACCESS TYPE	DELAY
READ or WRITE only	No automatic delay
READ followed by WRITE or WRITE followed by CHECK	At least ONE lost revolution
READ followed by WRITE followed by CHECK	At least TWO lost revolutions

Block Size (records)	Effective Transfer Rate (bytes per second)
1	80,000
2	85,700
3	102,100
4	108,000
8	126,300
16	137,000

Table 3. Often much higher than this due to the loss of revolutions as a result of software written without consideration of the way discs operate.

Combining these, and many other curves for different block sizes and hit-rates it is possible to produce curves such as those shown in Diagram 4. These represent the potential break-even points between disc and tape for the tape stated above, and IBM's 2311, 2314 and 3330. These relatively slow discs have been chosen because their transfer rates start at about that of the tape.

## CONFERENCES

## Friend or enemy?

Computers — the small company's friend or enemy? is the question posed at a conference to be held at the Piccadilly Hotel, London on March 6. Organised by the British Production and Inventory Control Society, the objectives of the seminar are to introduce the potential first-time user of existing user who wishes to install production and inventory control systems to the range of systems and equipment which is now available, and offer practical advice and guidance on how to choose and install such systems.

The international conference on APL, organised by the Leyden University Computing Centre, will take place from June 24-27, in the Leidenhorst Congress Centre, Noordwijk, near Leyden in Holland. APL80 deals with all aspects of the programming language APL. Details

As one would expect, a 2311 does not outperform tape except when blocks are very small. The 2314 is superior over a wider area, and the 3330 for a substantial range of blocking factors and hit-rates. It must be emphasised that the two lines here represent the boundaries of areas in which disc is quicker than tape. The Read or Write case is more complicated, and not conveniently shown on a diagram. However, a 3330 is always faster than tape for short processing times and for hit-rates below 60%. A 2311, by contrast, never outperforms blocks of four records on tape.

All of the above conclusions depend on software. The only way to decide between disc and tape in a given installation is to investigate the performance of the units available, which requires a dedicated machine known hit-rates and a range of blocking factors. The intention in giving the graphs shown here is to bring to users' attention the potential available in both disc and tapes, as a measure of the performance achieved in practice.

**BASIC FILE DESIGN**  
A new impression of *Basic File Design* will be available in March and copies may then be ordered from the General Sales Manager, IPC Electrical and Electronic Press Ltd, Dorset House, Stamford Street, London SE1 9LU. Price £1.00 each including postage.

from APL80 Registration, CRI, PO Box 5912, 2300 RA Leyden, Netherlands.  
Liverpool University's computer laboratory in association with the Journal of Microcomputer Applications, will hold a two-day seminar on March 31 to April 1. Further information from C. Bryson, Processor Workshop, Computer Laboratory, Liverpool University, PO Box 147, Liverpool.  
The Artificial Intelligence Simulation of Behaviour Society (AISBS) is to hold a meeting of its members at the University of York on 9-11. Major themes will be the relevance of these systems to the teaching of programming and mathematics. Details from Dr. Sleeman, Dept of Computer Science, Leeds University, Leeds, LS2 9JT.

## BOOKS

## Minimising security risks in large installations

**Computer Security and Protection Structures**, by Bruce Walker and Ian Blake. Dowden, Hutchinson & Ross Inc.

THE security of a computer installation — equipment, personnel, software, data — is never an exciting subject. Indeed, to the busy DP manager it is positively boring. It is one of those areas, like insurance, which is never a priority, yet is always vaguely worrying.

Everyone knows that the loss of a

computer room could be disastrous, yet the majority of installations are not adequately protected.

There is an urgent requirement for readable books which provide check lists and advice on how to minimise the risks within an installation and maximise the opportunities for continuing service if some losses do occur, accidentally or otherwise.

It would seem then that almost any book in this general subject area would

be welcomed. The book under review claims to contain "a complete survey of the applicable literature on computer security" although "only a very scant discussion is made concerning the problem of privacy".

The main text is divided into three parts: threats, counter-measures, and survey of implemented systems. This is followed by an extensive bibliography which covers 17 pages and contains over 180 entries. Most references are

American and are rather dated. The book is really only concerned with large installations. Terminals are briefly discussed but small installations, minis and micros are ignored.

Part one is a brief introduction and part two is the main part of the book. It skims briefly over such matters as physical security and insurance but is mainly concerned with the design of large operating systems.

Part three deals almost exclusively

with large and out-dated IBM and Honeywell software systems.

The text is irritating to read since virtually every paragraph contains references to books, projects, papers, people, machines and software systems, which serve to confuse rather than enlighten the general reader.

No doubt it will be useful as a source of reference in places of learning and research establishments.

PHILIP RULE

## Access to a Lisp system is needed

**Techniques of Artificial Intelligence**, by Stuart Shapiro. £8.70, 165 pp. Van Nostrand Reinhold Co Ltd (CW), Molly Millars Lane, Wokingham, Berkshire. Tel: 0734 789456.

A FUNDAMENTAL requirement in Artificial Intelligence is that all systems are designed with their implementation as computer programs (or their hardware equivalent) in mind.

Some people find Artificial Intelligence ideas vague unless they are shown specific programs implementing those ideas. That is the motivation of this book.

It is not intended as another textbook of Artificial Intelligence; it is to be a supplement to existing textbooks. As such it is not self-contained; it makes constant reference to other sources.

The terminology used and some of the algorithms are not explained, but assumed known to the readers. In fact, the whole book looks like program listings with interspersed comments.

Reading is difficult although, to be fair, this is partly to do with the reviewer's lack of fluency in the languages used (mostly Lisp, a little Microplaner and Snobol). Lisp is the accepted language for Artificial Intel-

ligence in the US but, due to the tendency of Lisp systems to be large, is less widely used among Artificial Intelligence workers in this country.

On closer examination, we find that most of the programs in the book do not actually make use of the one property of Lisp (together with Snobol and APL) that makes it superior to other programming languages: the uniform representation of program and data.

Thus most of the programs could have been written, more clearly in our view, in a Pascal-like language, and that would have made the book useful to many people outside the Artificial Intelligence community.

The choice of example programs is very good, if not representative of current trends in Artificial Intelligence, where the emphasis is on knowledge engineering, rule-based systems and so on.

The examples include A's algorithm, AND/OR trees, backtracking (using Microplaner's automatic backtracking facility), alpha-beta pruning, and Wang's algorithm for propositional calculus.

The book is an excellent collection of example programs in Artificial Intelligence, but of

limited value unless the reader has access to a Lisp system. Snobol, Microplaner and access to the various sources listed as 'readings' at the beginning of each chapter.

Dr SOEJ TAN  
Edinburgh University

## Very much a basic textbook

**Computers in business**, by Peter Haine and Ernest Haddon. L10 (hardback) £4.95 (paperback) Macmillan Press Ltd (CW), 4 Little Essex Street, London, WC2E 1-836 6633.

ANYONE reading "Computers in business" in the hope of picking up helpful advice on computerised payroll, VAT or even the electronic office, could well be disappointed.

The book is very much a basic text book for the business

student and graduate and is, in the best current tradition, based on the BEC/TEC computing studies module. Has technology therefore not made any major advance in 13 years?

As a computer application and approach primer, the book is most informative and could well benefit many practising DP personnel. Just how they would deal with the exercises, however, would make an interesting follow-up edition.

Similarly a book published in 1967 on real time computer systems is given as recommended reading. Has technology therefore not made any major advance in 13 years?

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Diffusion 150



Expert systems—the encoding of human expert knowledge in computer form—have reached the prototype stage in a number of areas and can be said to have arrived on the DP scene. Professor

Donald Michie examines some of these prototypes and will be discussing them at an Infotech state of the art conference in April.

He points to the unexpected discovery that an expert system

can be used to generate improved codification of expert knowledge and suggests that this "knowledge refining" could prove to be of the greatest significance to mankind in the long run.

# Knowledge-based systems become a serious force

by Professor Donald Michie

WORK has been quietly going on in research laboratories for some years to develop techniques whereby human expert knowledge, of the kind for which a professional consultant charges large fees, can be encoded in computer form.

Prototypes now exist which can hold their own as advisers in a number of specialised areas such as chemistry, medicine, geology, engineering and molecular genetics. Very recently an initial reconnaissance was made of a business application, namely the giving of advice on how to reduce income tax liability.

It is already clear that the application is highly suitable for artificial intelligence methods, and it seems certain that commercial development will follow at some stage, with diversification of machine-based expertise into even more lucrative areas of company law.

Clearly expert systems, as they are called, have arrived on the computing scene as a serious force. Let us consider what they are and how their design principles and mode of operation differ from conventional computing systems.

One critical difference lies in the nature of the building blocks. In a conventional program these take the form of actions (add, move, assign, etc) and tests (are two numbers equal?) is some structure empty?

A knowledge-based program, on the other hand, builds its expertise from "patterns". In its machine-oriented embodiment a pattern is a machine-executable description. The brain-oriented form is usually called a *concept*.

Associated with this, the interaction between an expert system and its user takes place at the conceptual level. In a clinical bacteriology application, the concept "probably *Escherichia coli*" might be encapsulated in some such descriptive form as "portal of entry is upper genito-urinary tract, and the organism is rod-shaped, and it stains gram-negative and it was isolated from a blood sample". The concept "a square" in a child's copying book might similarly be "four corners, two vertical straight lines, two horizontal straight lines, all parts of a single closure".

In order to facilitate exchange of concepts between expert system and human experts, "advice languages" have been developed. One example is Emycin, originally designed to handle medical knowledge, but subsequently used in a structural engineering context, and more recently in the tax advice application mentioned earlier. Similarly, the essential framework of the Prospector system, used at SRI International for advising on where and when to drill for ore, is now being retooled to generate an expert system to advise on fault diagnosis of oil

platform machinery in the North Sea.

The computer professional whose job is to design and test such languages is called a knowledge engineer. The human knowledge-source with whom he must closely co-operate in order to build and test a new application system is called a domain specialist.

A further distinguishing mark of the expert system is robustness, attributable to the highly modular mode of construction. The indivisible unit of the sys-

tem, typically comprising several hundreds of rules, will merely be the loss or degradation of some small part of its total capability.

In a number of application areas, today's expert systems are impressive. Emycin can reliably out-perform clinical specialists in diagnosing and prescribing in bacteraemia and in meningitis.

These systems, however, somewhat resemble the behaviour of a human expert who has become senile. So long as he

**an expert system can be used to generate greatly improved codification of expert knowledge for the use of consultants themselves**

tem's domain-specific knowledge is the pattern-based rule. Such a rule is an "if-then" construction, the if part being a pattern and the then part being an "action", construed broadly as an operation, or a new fact to be added to the knowledge-base, or a set of goals and/or constraints etc.

These rules are added incrementally, deleted or modified at will, and collectively they make up the system's expertise. But whereas a few random deletions administered to a conventional program will totally wreck it, the effect on an expert

sticks to what he already knows, he can still do extremely well. But if he strikes a case which goes beyond his stock of rules of thumb and demands creative reasoning, or if he is asked to improve his skill by generalising from fresh material, then he is at a loss.

This is the situation with knowledge engineering today: consequently, research is most actively concentrated in improving the reasoning abilities built into advice languages, not only deductive reasoning but also inductive.

Inductive reasoning is the process of generating and storing for future use new descriptive patterns from being shown examples and counter examples of the concept in question. The need for good algorithms for doing this on the computer is now very acute, since the limiting factor of expert systems development is the slow, tedious and costly labour involved in conveying needed patterns to the machine by the only other way known, namely by brute programming.

Concomitantly, the rewards of success are large. Recently two experienced programmers abandoned as too hard the task of encoding a descriptive pattern in the king-rook-knight chess ending. A complete and correct pattern was then synthesised from examples by computer induction, at the cost of only a few seconds' CPU time.

One of the problems of computer induction arises from the need to ensure that the final form which machine synthesised patterns take is such as to be mentally digestible to the human user. Since this conceptual transparency is one of the strong positive features of state-of-the-art expert systems, it is important to see that it is preserved.

Indeed, one of the applications for expert systems is precisely to

those highly complex and fast-moving control situations, as for example in air traffic control, or during serious system failures as at the Three Mile Island nuclear plant, where the operators are in danger of having their understanding of the situation further clouded, rather than clarified, by the flood of inadequately digested displays, messages and warnings put out by the machine half of the man-machine system.

A successful use of an expert system as an "intelligent mediator" in the man-machine process is Rita, developed at Rand Corporation to assist US Navy personnel to interact successfully with a large computer network so complex that the user tends to get lost without intelligent prompting and advice.

An aspect which is sometimes overlooked is the possibility of an expert system gathering its knowledge from several different experts, each specialising in different sub-domains. Prospector is a case in point, where its current knowledge-base has been put together from numerous "tuition" sessions with geologists knowledgeable about particular subjects—sandstone, uranium, nickel-sulphide deposits, and so on. In this way there is no reason why an expert system should not become more knowledgeable overall than any single one of its domain specialist instructors.

As for cost—the average cost of a Prospector consultation in terms of machine time is approximately \$10. Another factor in user-acceptance is physical size and portability. It is this writer's belief that an expert system should be sufficiently compact and rugged to load in the back of a station wagon. Work, oriented to the new range of super-powerful micros (such as DEC's LSI/11-23), is currently in progress.

Concerns naturally arise about possible threats to white-collar employment. Simple but powerful considerations indicate that such concern is wholly groundless, owing to the open-ended nature of a consultant's work (it is this which expert systems are expected partly to automate) as compared with the work done by blue-collar personnel.

In the latter case, automation of the operation which he is paid to do leaves the worker without a job. In the case of the consultant, however, he is enabled by virtue of his intelligent and knowledgeable assistance to tackle more challenging assignments and to enlarge the scope of the services he offers.

The following analogy makes the point clearly. The justices of the US Supreme Court already employ intelligent and knowl-

edgeable assistants. These are called law clerks. Supposing that the clerks through some miraculous happening became twice as knowledgeable. Would the Supreme Court decide to drop half its members?

Such a conclusion would seem quite nonsensical, particularly in view of the fact that the clerks are already substantially more knowledgeable, especially allowing for the time and energy they are able to devote to work of reference, than their masters.

Much has been written about the use of computers to process natural language, but it is only in the expert system area that such processing, even though done in a somewhat simple and humdrum way, is commonplace.

In the case of one important project, Lifer financed by the US Navy, knowledge engineering, natural language processing and database management techniques have all converged to make a single rather impressive system. Lifer's task is to keep up to date on the whereabouts, status and vital statistics of every ship of the Pacific fleet, and to answer English-language questions in a knowledgeable and resourceful way. The difference between such a system and modern database-query systems lies in Lifer's ability to "work the answer out" from other facts known to it in the cases where it does not have any direct answer to the question in store.

In this last respect there is an affinity between work on expert systems and various studies on mechanised deduction, theorem-proving and the like. The point at which these themes are concentrated is the development of languages based on mathematical logic, with built-in rules of inference as part of the interpreter. A case in point is Prolog, designed in the UK and on the Continent of Europe. Its recent use for commercial work indicates that its further growth should be watched.

In closing this sketchy overview, reference should be made to the unexpected discovery that an expert system can be used to generate greatly improved codifications of expert knowledge for the use of the consultants themselves, more complete, accurate, compact and clearly organised than the pre-existing text-book and cook-book formulations of human authorship.

In today's conditions of "information explosion" and the accompanying need for better methods for sifting and organising knowledge, it may be that this "knowledge-refining" effect will prove, in the long run, of greater significance for human society than any other.



Michie (right) is professor of machine intelligence at Edinburgh University and is a regular contributor to Computer Weekly.

## Is applications programming a dying art?

by Nicholas Enticknap

A FEW weeks ago my Page Six colleague Judith Morris advanced what is becoming a fairly widespread view: that the applications programmer is dying and will in the foreseeable future become extinct (CW January 3). This view has seemed to me for some time to be unsound and I feel that the time has come to say so.

It is not the first time in the history of computing that a prediction of this kind has been made. Very similar arguments were advanced during the economic recession of the early Seventies, when this paper's advertising executives had really to scratch around for each and every job ad and the size of the total paper rarely exceeded 24 pages.

Apart from this evidence of declining demand and trade figures which showed an absolute decline in the acquisition of computer equipment, the pundits of those days pointed to the potential of the packaged applications program, which was widely hailed as the solution to the problem of software maintenance.

It was also argued that although hardware costs had

fallen dramatically over the previous two decades and the technology had similarly improved, software had remained largely static in both respects. The sheer economics of this situation, it was thought, would force the attention of the industry on to the improvement of software effectiveness and this would result in computers which were much easier both to use and to maintain, thus eliminating the need for specialist support staff.

In fact, as we now know, this expectation has proved entirely false. As soon as the recession passed, demand not only returned to but surpassed its previous level dramatically and has continued at its new peak until the present day. This has been reflected in the size of Computer Weekly, which has generally been between 48 and 64 pages, and by the fact that we now have three weekly competitors.

Not that any DPM needs this kind of evidence; the shortage of staff has been one of the most enduring problems of the computing community.

Despite this, however, the view that applications programmers are on the way out is

gaining strength. The development of database query languages and of software generators and the spread of languages like Basic, which can be mastered by non-specialists, are quoted as evidence. Eventually, the argument runs, the applications programmer will disappear entirely; such programming as is necessary will be done either by expert systems programmers,

high as it has ever been; one sample issue chosen at random suffices to quantify the position. In the issue of October 25, 1979, for example there were a total of 137 recruitment advertisements. Of those, just under a half were looking for programmers of varying degrees of skill and responsibility, while a quarter wanted programmer-analysts. In all there were 210

**The imminent demise of the applications programmer is a much-discussed topic in the computer industry with the advent of even cheaper hardware and more English-like inquiry languages. But Nicholas Enticknap reveals his own researches which suggest that programmers are far from a dying breed as lack of expertise is holding up further developments.**

employed in the main by manufacturers and systems houses, or by laymen as part of their jobs.

Applications programmers who have been losing hair or sleep worrying about this must have been finding Computer Weekly's job ads very soothing reading. The demand is still as

separate job opportunities for professionals with programming experience (counting each job as one; quite a number were looking for more than one person).

Even more indicative is an analysis of the programming languages required. Of the 210 jobs, 136 of them specified a

particular language or languages as a mandatory or at least a desirable qualification. Of these, 92, or three out of every four, wanted Cobol (for the record, the next most popular high-level languages were RPG II, PL/I and Fortran, each of which was specified in 12 advertisements, or one in every 11).

If these figures are to be believed (and I know of no reason why that issue should be untypical) the present position is precisely the opposite of that being so widely predicted. Which must surely lead one to question the prediction, at least to the extent of asking what new factor is suddenly going to come into play.

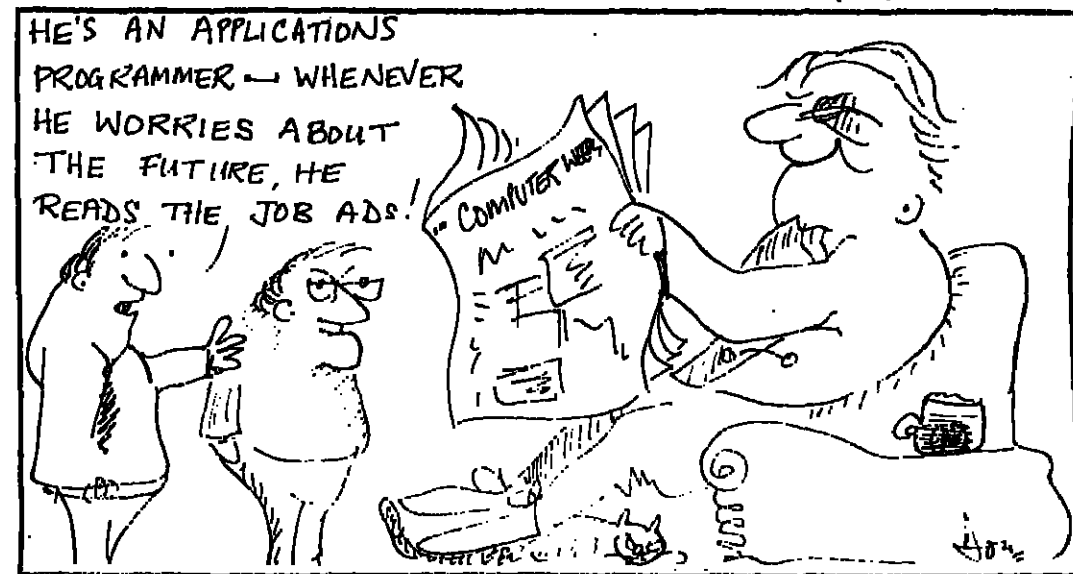
After all, there has now been a decade's worth of effort expended in the cause of improving software effectiveness. Structured programming techniques have been exhaustively studied, program packages assiduously promoted for the whole of that time. Software reliability and software engineering have assumed the status of specific disciplines.

The improvements these developments have brought about have, however, been more than

offset by the spread of computer usage, with the result that the total number of programming man-hours required to keep the computing community performing to capacity has consistently outstripped the programming resources available.

To assume that this will cease requires one of two assumptions either that there will be some kind of breakthrough in software generation of a fundamental nature, or that the tendency for computing usage to increase will vanish. Until such an assumption can be cogently argued, the applications programmer need not fear.

Apart from the existing spread of jobs, new ones are developing all the time. In particular, there is a massive need for software specialists of all kinds in micro-computing. The danger is not so much that there will be too many programmers, but that there won't be enough. My prediction for the decade is not that the programmer will become redundant but that the computing progress will come at a much slower rate than we expect simply because there is not enough expertise to put it into practice.



### Wilkes Computing

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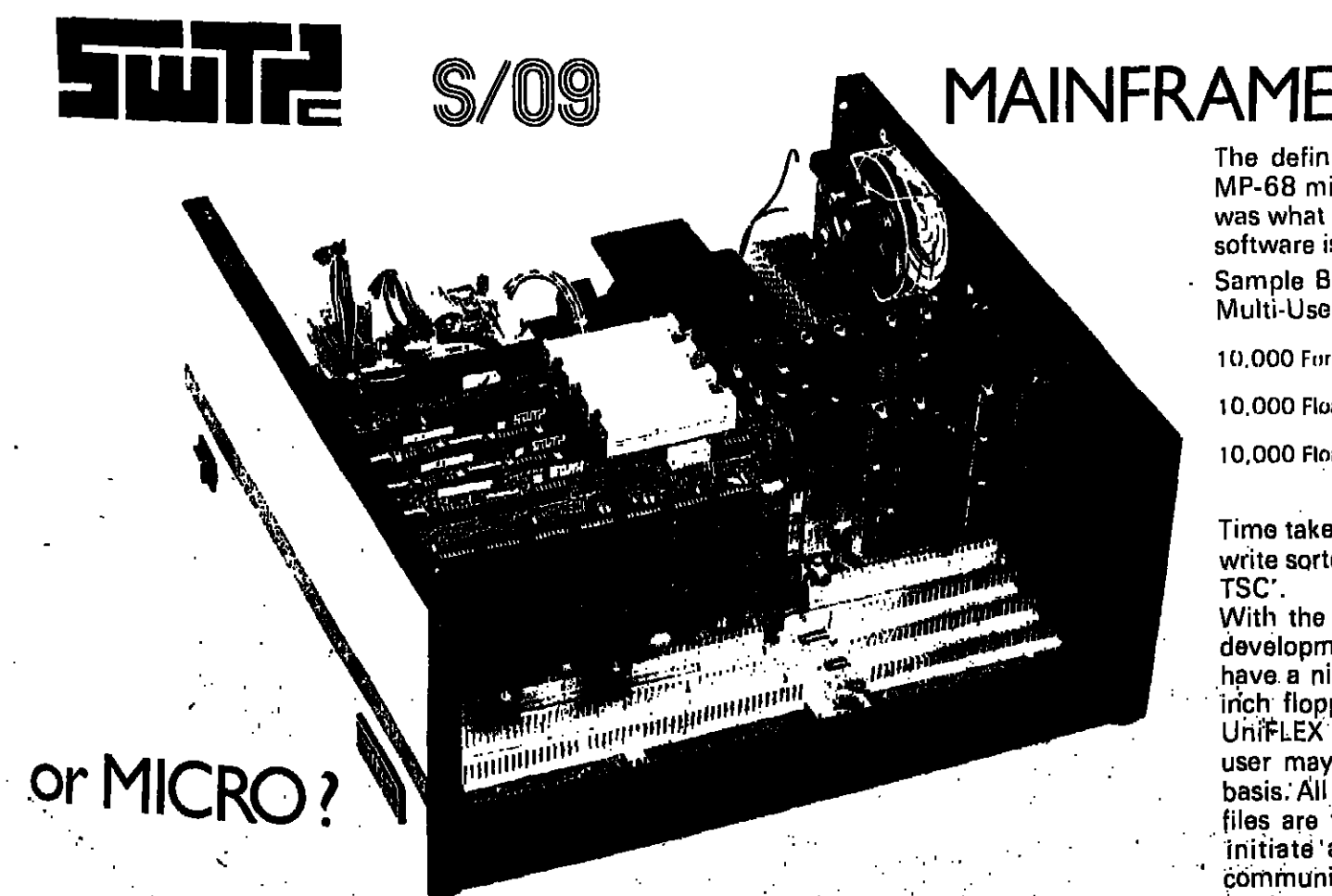
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The definitions are becoming blurred. When we produced our MP-68 microcomputer kit with 4K RAM over four years ago that was what micros were all about. Our latest system and its support software is a different story:-

Sample Benchmarks on a 128K system with 4 terminals using Multi-User Basic:-

10,000 For — Next Loop Overhead	2,336 secs	10,000 Integer Comparison	15 126 secs
10,000 Floating Point Addition	24,628 secs	10,000 Floating Point Multiply	93,031 secs
10,000 Floating Point Division	105,704 secs	10,000 File search on 10 digit numbers to find the lowest using full end-to-end search	128 888 secs

Time taken to read 10,000 Random 10-digit numbers, sort, and write sorted file to disc 14 1/2 minutes, using the Sort Utility from TSC.

With the new UniFLEX Operating System which is in the final development stages by TSC a sample system configuration might have a ninety megabyte disk, a thirty megabyte disk, two eight inch floppies, a parallel driven printer, and six user terminals. UniFLEX is a true multi-tasking, multi-user operating system. A user may read, write, or execute protect files on an individual basis. All system I/O is device independent since I/O devices and files are treated in an identical fashion. Any running task may initiate another task in an asynchronous manner. Inter-task communication is also supported. Task swapping may take place on those systems incorporating an appropriate swapping device. In real time applications, where swapping may be detrimental, it is possible to lock a task in main memory.

TSC are Technical Systems Consultants Inc. of West Lafayette Indiana.

### Southwest Technical Products

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Our client is the New European Display and Peripherals Division based West of London, of a Major American Corporation with a T/O in excess of \$600M.

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59 Edway Street, Kingston upon Thames, Surrey KT11BW  
Telephone: 01-549 6441

## UMRCC

UNIVERSITY OF MANCHESTER  
REGIONAL COMPUTER CENTRE  
Director: Professor G. Black

## MICROPROCESSOR SECTION MANAGER

UMRCC is a national centre providing a general service to over thirty universities in the United Kingdom. This is currently based on two Control Data 7600 computers each front ended by an ICL 1900. An interactive computing service is provided for Manchester users on a CDC CYBER 72, shortly to be enhanced to a CYBER 170/720 accessed by over a hundred terminals.

A new section is being established to provide advice, guidance and education about microprocessors to the academic community of the University of Manchester and UMIST. To provide equipment to enable users to familiarise themselves with the new technology and to provide software and hardware testing facilities.

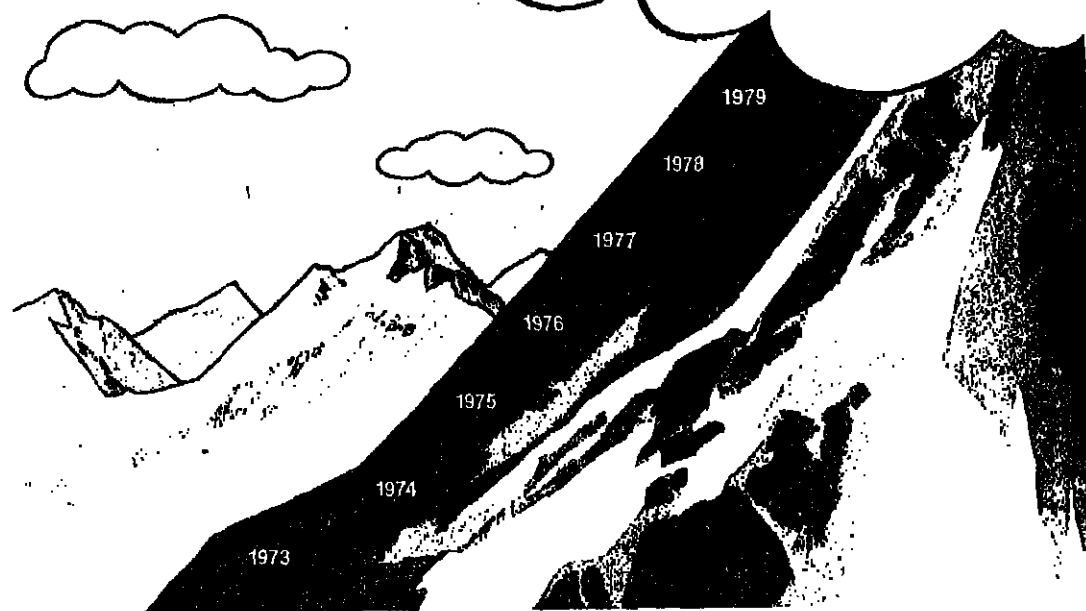
A manager is required to be responsible for the team providing these services, and to maintain liaison with microprocessor users.

Applicants should be educated to degree standard. Formal training in digital systems, computer science or electronics is desirable and applicants should have extensive experience of both microprocessor hardware and software.

Salary scale: £8,427 to £10,484 per annum, plus membership of USS, depending on age and experience.

If you have the necessary experience and would enjoy working in a stimulating environment send for further information and an application form (returnable by 13th March) to The Registrar, University of Manchester, Oxford Road, Manchester M13 9PL quoting Ref. 39/80.

## High Technology High Sales Volume High Earnings High Expectations



### High Time...

... you started talking with ICL about Sales opportunities in London and Home Counties. If you've seen our 1979 report, you'll know that ICL profits and turnover are up again by over 20%. Even if you only see the enthusiasm on the faces of our sales people, you'll get the message.

That is, we've got a tremendous range of products with the technology to exploit the considerable potential for further growth. And of course, there are other projects under development.

### The rewards are high

With commission, our successful sales executives can earn well into five figures; and there's enormous scope for career development. All this makes ICL the best place to be now for a sales career.

### Your background

We are looking for a technical sales background, ideally in business systems or D.P. You know that you can sell high technology

products, and you have the business acumen, confidence and personality to identify and convert potential sales in a wide range of business situations.

For details of the informal interviews we are arranging early next week in central London, phone Lynda Murray now (up to 7.0 pm), on 01-788 7272 extension 2592. Or write to her at ICL, Bridge House North, Putney Bridge, London SW6 3JX, quoting reference UKD 120/CW 1624.

## International Computers

think five figures — think ICL



## DATA COMMUNICATIONS — SYSTEMS ENGINEER

A Company well established in the field of Data Communications is seeking to recruit Systems Engineer. The post is available for an engineer who has proven ability and experience in this field and is capable of appraising potential customer requirements in Data Communications. The work involves Data Communications System Synthesis, consulting with and advising salesmen, system co-ordination, monitoring new developments, products and state-of-the-art.

Such an engineer should be conversant with the applications of high speed modems and the equipment and problems associated with the transmission of high speed data over private and public lines.

The post is a key position in a Company which has a reputation for growth and enthusiasm to service customer requirements.

Salary, negotiable plus car, plus fringe benefits.

Apply: Miss S. J. Sowerin, Personnel, Cole Electronics Limited, 105/107 Lansdowne Road, Croydon, Surrey CR0 2BN, Tel: 01-880 3507.

## OPPORTUNITIES IN SYSTEMS

Our Clients are a leading British Engineering Group located in Warwickshire.

As part of a programme of planned growth they wish to make the undermentioned appointments:

### SENIOR ANALYST

to work on Production Control systems and to assist in development and re-design of manufacturing systems.

Experience of computer systems and production control systems is required.

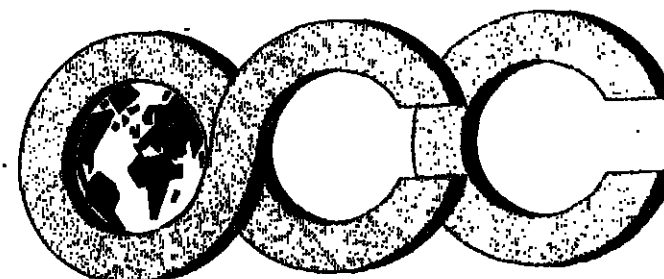
### ANALYST — FINANCIAL SYSTEMS

to assist in the development and re-design of financial systems.

An Accountancy/Commercial qualification is preferred and reasonable experience of computer systems.

Interested applicants should write or telephone for further details and a personal history form to:

Chief Executive  
Aline Recruitment Consultants  
Aline Chambers, 1 High Street  
Leighton Buzzard, Beds. LU7 7JH



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service to computer  
professionals

## Analyst/Programmer

**c.£14k Tax Free + Co. Car  
Jeddah**

An experienced Systems Analyst/Programmer is required for an established computer installation operated by the leading Motor Distributor in Saudi Arabia.

The present installation has an IBM 370/115 running Batch Systems for accounts and stock control functions. A4341 is on order for delivery at the end of 1980 when it is planned to have converted to on-line systems. Candidates should have at least eighteen months' practical experience of RPGII, CICS and DOS/VS.

There will be a high degree of User involvement and the position will suit a self-starter. Experience of the distributive side of the motor trade would be an added advantage. Arab applicants will be given preference provided that they meet the requirements of the job.

The position is on bachelor status and in addition to the attractive salary and air conditioned car, our client offers:

- \* 30 days' leave plus approximately 12 public holidays p.a.
- \* One return airfare to Britain p.a.
- \* Free furnished accommodation of good standard with free electricity and water.
- \* Free medical treatment.
- \* Additional baggage allowance

Interviews will be held early in March and interested applicants should telephone Mike Madon on 01-242 9356 (days) or 01-807 7425 (evenings). Alternatively write to the address below quoting reference 914/CW.

OCC Computer Personnel Limited  
16 Bedford Row  
London WC1R 4EB  
Telephone: 01-242 9356



## Programmers

**Location: Sheffield c.£5,500**

The Midland Bank, one of the country's major computer users, has multiple computer centres based mainly on large IBM and Burroughs mainframes and is seeking people with initiative, self-motivation and good ability to communicate and who will accept the opportunity to develop their career using the latest technology and techniques.

Vacancies exist primarily for experienced IBM programmers, who will work in teams to develop systems on IBM 3030 Series mainframes for the Bank's International Division and Head Office Departments. All new developments are using data base techniques with data collected through large on-line networks.

The successful applicants will be working in a disciplined environment using structured techniques and inter-active development methods. The systems will be developed using TSO under MVS whilst the networks and data management are controlled by CICS and ADABAS respectively. It is expected that applicants will have a proven knowledge of COBOL and Assembler but programmers with PL/I or Mark IV experience will also be considered for existing systems.

Candidates are likely to have at least two 'A' levels and will be in the age range 23-30. Salary will be within a scale commencing at £5,500 p.a. and will depend on experience. There is also an excellent non-contributory pension scheme together with all the other fringe benefits associated with a major clearing bank.

Applications giving full details of age, qualifications, experience and present salary should be addressed to: Computer Operations Personnel Manager, Midland Bank Limited, Griffin House, Pennine Centre, 41 Silver Street Head, Sheffield S1 3GG.



## Bureau - London

This Central London Bureau has a market reputation which is the envy of its competitors, and they intend to stay at the forefront in the provision of on-line Computer Services. Ever-increasing demand for their products has created openings for experienced COBOL Programmers (3 or more years) for their business applications group, and Fortran Programmers for the technical support team. You will find variety, stimulation and individual responsibility working in small project teams; you should be energetic and enthusiastic, able to cope with the swift pace of life generated in this exciting and technically advanced

environment. Rewards are high, in addition to considerable job satisfaction you will receive an excellent salary plus profit-sharing and incentive bonuses. Ideally situated for the commuter, Matrix will be holding initial interviews during late February/early March, after which suitable applicants will meet the Company's senior personnel for final selection.

**£6.5 - 8.5K**

## CICS

Switzerland — CICS Systems Programmer urgently required by West London Software House for current project; applicants must offer in-depth knowledge of Assembler, COBOL and DLI and have been involved in generation/implementation of new CICS releases.

£12-16K

## Basic +

Programmers and Systems Analysts, preferably with BASIC + and knowledge of DEC hardware, RSTS and RSX-11, required by leading manufacturer of interactive business systems. Opportunities in London and other UK locations. Bonus schemes, car allowances and other benefits. £6-8.5K

## Project Leaders

**The Software House with a Difference**

The Company: unlike many Software Houses, this Company will not expect you to spend many months every year away from your home. In their specialised field of minis and micros much of the development work is in-house at their prestigious London and Surrey offices; their main fields of activity are sophisticated on-line real time Financial Systems (banking etc.), Information Handling Systems, and micro-based Industrial Automation Systems. With a sound financial base and a strong track record, the Company's policy is for promotion from within, offering excellent career progression to the right applicants.

The Opportunities: Project Leaders with a strong programming background in the financial or technical fields are offered challenging and responsible positions, with a high degree of autonomy and authority to direct the efforts of their teams. Hardware and software experience, allied to good analytical and communication skills are highly valued, and will be suitably rewarded in this well-organised, professional environment. You should have experience of handling complete systems, from feasibility studies through to installation. If you are looking for a quality approach to modern computing problems, plus project responsibility, our Clients are waiting to hear from you.

**Starting Salaries up to £11K**

## Data Comms Europe

Top Flight System Engineering Specialists are required by a major Computer Manufacturer for a telecommunications project currently being undertaken at their European headquarters. It is unlikely that candidates with less than 10 years DP experience will be qualified for these positions, which will involve designing new software architecture, databases etc. for digital telephone switching systems. Ideally you should offer expertise in stored program telephone control systems, although senior level Real-Time Data Communications experience generally is of interest. There is no language requirement, and you will be located in a beautiful and historic European town close enough to the Alps to satisfy any winter sports enthusiasts.

**c.£20K**

## Italy

If you are well-educated and bright, with experience in systems software e.g. Compiles, Operating Systems, Emulators and Drivers, opportunities exist in Rome and N. Italy.

c.£10K

## ICL 2900

Technicians, Programmers, Designers wanted for on-line transaction processing system in North London. Knowledge of VDU's command and control systems, communications advantageous. BUPA, car scheme, pension scheme etc. £7-9K

## Sys. Analyst

Life Assurance company in North West London wants Analyst for support, development etc. of on-line and batch systems. 2+ years' analysts with knowledge of PL/I and BAL programming. Mortgage subsidy scheme. c.£7.9K



10 Grenville Place  
London SW7 4RW  
01 373 3063

*App. 1.5K*



The Central London Headquarters of a well-established international software house network are inviting applications for the following posts to fulfil their planned growth requirements.

## ANALYST PROGRAMMER

to £8,500 p.a.

Applicants should have at least four years' experience in data processing, as well as a sound commercial knowledge of mini-computers.

## PROGRAMMERS

to £7,000 p.a.

At least two years' experience is required for these vacancies — preferably on mini-computers. A knowledge of BASIC is desirable although not essential.

The above positions are permanent and offer extremely good long term career prospects within this fast-moving and progressive company.

The working environment is friendly, and as well as the above salaries there are excellent fringe benefits. Interviews will be held in London through February and March and offers will be made to successful candidates within one week of interview. Ref. No.: 2A/B/80.

Our client is one of the world's leading companies in the exploration and development of petrochemical resources in the Middle East. Their growth over the last few years has been phenomenal, and due to further expansion they require a number of EDP staff, to be based in Saudi Arabia. Two of the vacancies are outlined below. In addition there are further vacancies at various levels for ANALYSTS and PROGRAMMERS.

## BUSINESS SYSTEMS ANALYST

Salary negotiable

Applicants should have at least 5 years' working experience of conducting feasibility, business and computer systems studies for Data-Base and teleprocessing applications, in such areas as purchasing, materials, personnel, and medical services.

## APPLICATIONS SYSTEMS ANALYST

Salary negotiable

To fill this challenging and demanding position we require a person who has a B.Sc. in Chemical or Civil Engineering and at least 5 years' experience of programming in Fortran and/or PL/1. It is also desirable that you have experience in several application areas on large IBM mainframes.

The salaries are all you would expect from a large multi-national company, and the benefits package is extremely competitive and includes overseas allowances, subsidised accommodation and recreational facilities, medical care and air travel to and from the United Kingdom. All vacancies are bachelor status only, but are open to male and female applicants. Ref. No.: 2B/8/80

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# COMPUTER WEEKLY CLASSIFIED

01 261 8028/8097/8019

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c.£6.5K **PROG./ANALYST** London  
2 yrs programming and analysis experience. COBOL preferred but not essential.

c.£7.5K **SNR. PROGRAMMER** London  
2-3 yrs programming in COBOL, with experience in program suite design/specification and implementation.

**Eneg. ANALYST** Beds  
About 4 yrs experience using mainframe in real time scientific environment. Programming background desirable. Physics useful.

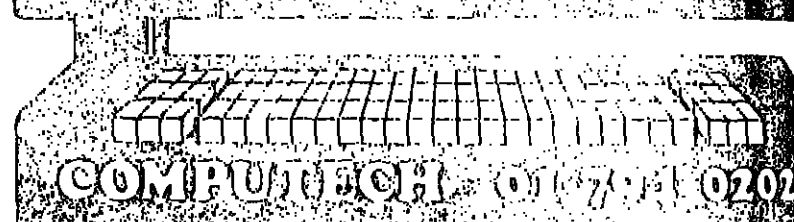
**To £7K PROGRAMMER** Bucks  
Minimum 1 yr programming using RPG II, COBOL, programmer willing to retain credentials. Hardware System 3 Model 140, and System 34.

**To £9300 SNR. ANALYST** Surrey  
At least 3 yrs experience in commercial/financial systems or similar mini computer knowledge an advantage.

**To £8400 JNR. ANALYST** Surrey  
Good communicator with sound knowledge of COBOL and formal education in Systems Analysis.

Many more unadvertised positions

COMPUTECH SYSTEMS & PERSONNEL  
168 Finchley Road, London NW3 6HP



## APPLICATIONS PROGRAMMER

SCIENTIFIC DATA BASE SYSTEMS

The Crystallography and Data Bases Group of the Daresbury Laboratory has a vacancy for an applications programmer to join a team working on the development of data base systems for use by scientists in the Universities and within the laboratory. This area of work is growing constantly, and presently includes interactive retrieval systems for crystallographic and chemical data banks and a data base management system for atomic scattering data. Available computers include an IBM 370/165 and the DEC system-10 and PRIME Minicomputers of the SRC's Interactive Computing Facility.

The post offered is a permanent position on either the Scientific Officer or Higher Scientific Officer salary scales £3,591 to £5,498 + £5,097 to £6,737 respectively at a level depending upon age, qualifications and experience. Applicants of either sex should have a good honours degree in a scientific discipline and have considerable computer programming experience. Some knowledge of data base management systems would be an added advantage.

There is a non-contributory superannuation scheme, a generous leave allowance and a flexible working hours scheme. Closing date: 28th March, 1980. Please write (or telephone 0925-85000, ext. 467) for an application form quoting reference DL/721/CW to:

The Personnel Officer  
DARESBUY LABORATORY  
Science Research Council  
Daresbury, Warrington WA4 4AD

## COMMUNICATIONS MANAGER

BWIA International, the airline of Trinidad and Tobago, is inviting applications for the Manager, Communications, based at head office in Trinidad.

The position includes responsibility for data telecommunications, air to ground, and administration of these and other local communications services. The airline has recently installed an Integrated On-Line Reservations System (IPARS) and is activating the related data network. Further developments require expansion and additional voice/data capabilities.

Communications Analysts are also required to support and monitor the network on a day-to-day basis.

Applicants should have Degree level qualifications and an extensive working background in network design, international data communications, fault diagnosis and use of related equipment. The post of Manager is a senior position reporting to the Corporate Manager and requires that applicants have experience at managing a Communications Department.

An attractive compensation package is offered.

Apply in writing to the Personnel Manager, BWIA International, 20 Lower Regent Street, London SW1V 4PH.

Unsuitable applicants will not be acknowledged.

# Major NEW Installation... team!

Our client, one of the UK's most successful exporters enjoying a very rapid growth rate, has decided to instal an IBM 4331 in mid 1980. The company attaches much significance to data processing in that the Director of Computing reports directly to the Chairman.

Recently we advertised for three key managers for this installation which will be on-line and database orientated making maximum use of on-line COPICS. We are now seeking a number of experienced d p professionals to join the small but dynamic teams that our client is intent on establishing.

## SENIOR SYSTEMS ANALYSTS

These positions will report to the Systems Development Manager and will carry responsibility for leading a small project team in the development of computer systems to service a major area of the company's activity.

It is essential that candidates have a well proven track record of developing and implementing systems, preferably in a manufacturing, distribution and stock control environment. Preference will be given to systems analysts with previous experience of on-line systems and database, preferably in a medium sized IBM environment. (Reference CW/8019)

£9000

## ANALYST/PROGRAMMERS

There are several vacancies for experienced analyst/programmers who must have several years experience developing major systems. In technical terms a background of IBM hardware and software would be advantageous, particularly DL/1. Programming language will be COBOL and considerable use will be made of other programming aids, such as EASYTRIEVE. These positions offer excellent scope for ambitious candidates wishing to work solely on the development of major new systems. (Reference CW/8020)

£7750

## PROGRAMMERS

Our client would like to hear from ambitious young programmers, who should have two to three years experience programming in COBOL. An IBM background would be useful but is by no means essential for all of the vacancies as appropriate retraining will be provided by our client. (Reference CW/8021)

£5500 to £7500

Salaries for these appointments will be negotiated in line with the indicators above and other normal benefits will include relocation expenses. Interested candidates should contact Ivor Norton to arrange a confidential discussion.

Ivor Norton Management Services Ltd

LONDON  
52 Shaftesbury Avenue, London W1V 7DE  
01 734 8862

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P.O. Box 63, Copthall Tower House,  
Harrgate HG1 1TS Harrgate 68628

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## LONDON CONTRACTS

### ANALYST/PROGRAMMER

**£250 + HANTS**  
An IBM 370 PL/1, CICS programmer, preferably with VSAM experience is required to help with the system design of an on-line system. Start an initial 3 month contract at the beginning of March.

### ANALYST/PROGRAMMER

**£250 LONDON**  
Start as soon as possible on a 3 month contract. IBM 370 using PL/1 DL/1 and CICS, to write commercial applications.

### PROGRAMMERS

**£250 LONDON**  
Data General Nova, Fortran and Assembler programmers to make additions to the existing system. Start as soon as possible on a long contract.

### PROGRAMMERS

**£250 LONDON**  
Good Cobol programmers with Data General Nova and/or ICL experience, to work on a conversion project. Start as soon as possible.

### ANALYST/PROGRAMMERS

**£250 BEDS**  
Develop an on-line system using your IMS Cobol experience start as soon as possible on a long contract.

### PROGRAMMERS

**£250 BERKS**  
Cobol CICS and DOS/VS programmers are required to work on commercial applications March start on a long contract.

Please phone or write to the Contract Division or your nearest KPSL office to find out more about these and many interesting assignments.

**01-734 0152 (24 hrs.)**

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## NIGERIAN NATIONAL PETROLEUM CORPORATION

### VACANCIES FOR COMPUTER PERSONNEL IN WARRI AND KADUNA REFINERIES

Applications are invited from suitably qualified candidates for the following posts in the Nigerian National Petroleum Corporation's Refineries at Warri and Kaduna:

#### 1. DEPUTY DATA PROCESSING MANAGERS:

##### Qualification and experience:

Preferably, graduates in the computer science, Mathematics or Engineering, possessing 7-10 years' experience on computer programming, systems analysis and design, backed up with non-management experience.

##### Duties:

Responsible for: the implementation and running of such system as sale accounting, payroll, plant maintenance and stock control; all systems for programming operations, data preparation and control, a large number of staff.

#### 2. CHIEF SYSTEMS ANALYSTS: CHIEF PROGRAMMERS:

Candidates for these posts should have similar qualifications to the ones mentioned in 1 above but with 7-8 years' experience

##### Duties:

Reporting to the Data processing Deputy Manager at the particular installation; the successful candidate will be involved in the day-to-day control of the site. He will plan for advice NNPC on further potential users of the systems and be responsible for a team of programmers, systems analysis and other staff.

#### 3. PROGRAMMERS AND SYSTEMS ANALYSTS:

Candidates for any of these should be graduate / HND holders in Computer Science, Mathematics, Science or Engineering with 2-3 years' experience as programmers or systems analysts.

##### Duties:

Successful candidates will be in charge of design and implementation of the systems, all programming and package re-designs and development of new programmers and packages.

For all positions, there will be specific training as and when necessary.

Applications should be directed with full curriculum vitae to:

The General Manager  
Project Engineering Division  
N.N.P.C.  
Falomo Office Complex, P.M.B. 12701, Ikorodu, Lagos

to reach him not later than 3 weeks from the date of publication.

## MYRIAD

### WE'RE LOOKING FOR SOMEONE SPECIAL PRODUCT CONSULTANT

U.K. BASED

★ DOS/VS EXPERTISE

KNOWLEDGE OF SYSTEMS SOFTWARE

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★ IBM ASSEMBLER USEFUL

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★ c. £10,000 + CAR

★ SENIOR APPOINTMENT

★ INTERNATIONAL TRAVEL

This is a unique position within a world-wide organisation able to offer career advancement with a difference. If you feel your job lacks challenge, your ideas are being stifled and your DOS/VS knowledge is never extended, this could be your chance to prove your worth and be paid your worth! To cope with the ever-increasing demand for its products and to maintain its leading position in the software field, the Company has ambitious expansion plans, thus presenting the person appointed with considerable scope for career progression. A good starting salary is further enhanced by a company car and first-class conditions of employment, including generous relocation expenses where appropriate.

REF. S1/2102

## ARE YOU A PROBLEM SOLVER?

SURREY

TO £8,000

### QUALITY ENGINEERS

### SOFTWARE PROGRAMMERS

Applicants should have at least three years' experience of scientific/technical programming with a bias to the organisation of this work in respect of project engineering and quality assurance activities. A relevant qualification and an appreciation of the fundamental principles of quality engineering are essential. Successful candidates will evolve techniques for the application of quality assurance practices to software operations during all stages of design, development and operational use. They will generate procedures for the control of the Company's Computer facilities, software and related documentation, in accordance with the Company's quality policy and customers' requirements.

#### CDC

These programmers will require extensive Assembler and operating system experience gained on CDC equipment in order to implement enhancements, modifications, additions and updates to the CDC NOS System.

#### RSX-11

Programmers with extensive experience of MACRO-11 programming and the RSX-11 operating system are required for work in a variety of defence applications.

The Company specialises in feasibility studies project management and bespoke systems for advanced technological applications covering industry, communications and electrical engineering. Large company benefits are mixed with small company involvement at their modern offices in Surrey.

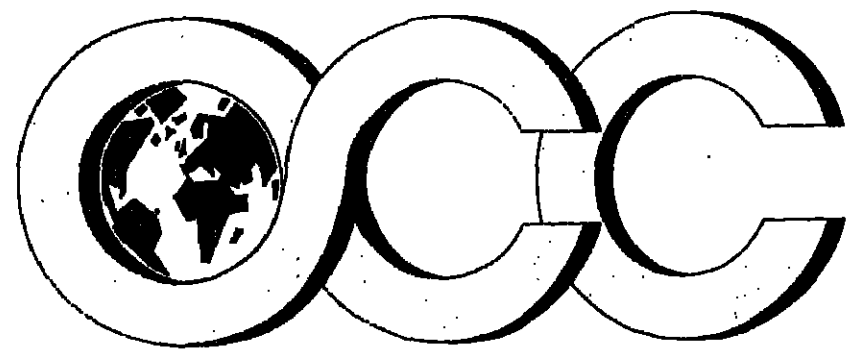
REF. S3/2102

MYRIAD APPOINTMENTS LIMITED

30 Fleet Street London EC4Y 1AA Telephone 01-353 0981 24 hours

*Handwritten signature/initials*





*Specialists since 1971 in UK and International computer appointments. We have many vacancies in the UK and throughout the world, apart from those shown here, and we also offer a free career counselling service to computer professionals.*

## Switzerland Integrated communications systems

Our client is an international company, established in the telecommunications field.

The Swiss company, based in Berne, is the biggest industrial firm in the city. Their research and development teams are leaders in selected areas of telecommunications.

Their current project is a complex integrated communication system using computer techniques to control electronic exchanges.

The project is at an advanced stage in terms of hardware. The software team needs several experienced and qualified professionals to guide the project to its successful conclusion.

This is an opportunity to join an existing project backed by the expertise and experience of a top company. Berne is a charming town, full of history, a cultural centre in the Heart of Europe, within half an hour drive from skiing resorts.

Information regarding the project, conditions of employment, taxation, cost of living, etc. will be provided on request. Our selection interviews will start in a week's time. Client interviews will take place in London mid March.

OCC Computer Personnel Limited  
London 01-242 9366 16, Bedford Row, London, WC1R 4EB  
Nantwich 0270-627206 4, Church Lane, Nantwich, Cheshire, CW5 5RQ

## Team Leaders (2) Chief Programmers (2) c£17,000 p.a.

The requirement for the above vacancies is as follows:

- ★ A broad knowledge of Software design methods
- ★ A good understanding of interfaces at software system specification level
- ★ At least five years' experience in a Real Time software development environment
- ★ A major involvement in at least two projects successfully implemented
- ★ The ability to direct and supervise staff.
- ★ Previous experience in telecommunications, a knowledge of System X or equivalent project would be a distinct advantage.

A knowledge of German would be advantageous. Alternatively, candidates must be prepared to take an intensive language course.

The positions are permanent. A relocation package is available. Accommodation in a company flat is offered for the first month if required.

*To apply, please contact Renée Nute or Mike Mead on 01-242 9366 (days) or write to the London address. If it would be more convenient to telephone in the evenings or during the weekend please ring 01-874 6372 (Renée Nute) or 01-807 7425 (Mike Mead). Please quote ref: 60 1/CW.*



## SURREY/SW LONDON SYSTEMS ANALYST UP TO £9,000

## SENIOR PROGRAMMER UP TO £7,500

This is without doubt an exceptionally good time to team up with a progressive installation based in NW Surrey. Consider the following:

- ★ New IBM 4341 4MB due soon
- ★ New Database and TP projects
- ★ New word processing system in use
- ★ Current environment IBM 370/148, DL/1, CICS, PL/1, MK. IV, APL
- ★ Car/mileage allowance, parking and generous holidays
- ★ A relaxed and friendly professional atmosphere

The above reflects the current status of a challenging environment. Full training is provided in order that you may fully exploit the system potential and career prospects.

All candidates should have relevant experience. For further details please contact Eddie Howard.

## COBOL PROGRAMMERS & ANALYST PROGRAMMERS WEST OF LONDON

**SALARIES AT ALL LEVELS  
FROM £5,000 UP TO £8,000**

This multi-national company is concerned with the development and implementation of mini-computer based systems. The software group is divided into project teams, each providing a visible contribution to a number of project systems.

Two of these teams are concerned with software validation and the development of application packages. They have a requirement for cobol based analyst/programmers and programmers to become involved in all aspects concerning these areas. Ideally candidates should have a sound commercial background. Experience with real-time or data-base systems would prove most useful, but a background in commercial data processing with cobol is the essential ingredient as training will be provided in the relevant areas.

Relocation will be provided where necessary, and the usual benefits associated with a company of this size are provided. Conveniently situated, they are easily accessible from London and the Home Counties. For further details please contact Eddie Howard.

## REAL-TIME SYSTEMS CONSULTANCY

**UK — HOLLAND — GERMANY  
— SWITZERLAND**

We have a number of attractive openings in Europe with a select group of highly professional companies. These appointments offer rewarding and varied career opportunities to individuals with experience in any of the following areas.

COMPUTER COMMUNICATIONS — DIGITAL SWITCHING SYSTEMS — SOFTWARE ARCHITECTURE DESIGN — PROCESS CONTROL — REAL-TIME MINI/MICRO SYSTEMS — BASIC SOFTWARE DEVELOPMENT

If you are considering a move at the present time and would like to discuss these opportunities then please contact Mike Howard for further details.

## Edmund Howard & Partners

5 Brighton Road, Surbiton, Surrey, England. Tel - 01 399 9183

## MYRIAD

## CALIFORNIA

## THAMES VALLEY

## HOLLAND

DOS/VS SYSTEMS PROGRAMMERS— WILL YOU LEAD THE WAY TO THE FUTURE?

Unique opportunities exist for PROJECT LEADERS and PROGRAMMERS now seeking an environment in which their innovative skills and creative powers will be fully recognised. Permanent positions exist at all the three locations and in addition both short term and long term assignments overseas will be available to all employees.

If you would like:

- ★ TO USE THE LATEST IBM 4300 EQUIPMENT
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To achieve that, the company is buying in some of the finest marketing talent available and is looking to match it with the skills in the newly expanded Technical Sales area. Formal qualifications are less important than relevant experience and genuine flair for mastering a rapidly developing range of products. Peripherals have become the new economically critical components of all but the largest systems. This is your clearcut opportunity to develop your career and earning power in the area of maximum growth.

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Computer Centre  
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IN COMPUTER STUDIES**

Applications are invited for two additional lecturing posts within the Academic Division of the Computer Centre.  
Applicants should be graduates and should possess either a higher degree in computing or several years' practical experience of computer application.

**SALARY SCALE:** Lecturer II: £4470-£1149; Senior Lecturer: £6097-£7701 (plus £8263)

Further details and application forms (to be returned by 8th March, 1980) from: The Personnel Officer, City of Birmingham Polytechnic, Perry Barr, Birmingham B42 2SU. (021-255 6611, Ext. 217).

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We need a lecturer (or would-be lecturer) to help our Training team to produce and administer a complete course in data processing for our clients.

The course is based around a CMC REALITY mini and will range from DP orientation to advanced programming techniques in BASIC.

The starting salary will be around £8K-£7K and the position will be based in London.

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## Brooke Bond Oxo Limited Walton-on-Thames

Brooke Bond Oxo's data processing centre is based at Walton-on-Thames, where we operate a large IBM 3012 system currently running under MVS/SPS1 but will be changing to MVS in the near future. We are increasing our use of IMS/Database, Data Communications, and developing System 31 applications.

### Network Controller

Reporting to the Processing Manager the responsibilities are for the Network Service level and supervision of line controllers in a medium-sized network which is continuously expanding. You would be dealing with 1270 NIS type terminal equipment, RJE and System 31 utilising IMS, environ 1 and API through CMS.

Applicants should be fully conversant with communications hardware, modems and line testing equipment, and preferably have experience of IMS although this is not essential.

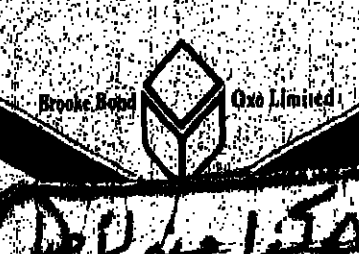
### Systems Programmer

This is an opportunity to join an expanding team in a progressive software environment. The existing team is currently concentrating on the conversion of MVS, IMS and communications software VTAM, and SNA. You will be able to use your initiative and develop internal DP control systems from design to implementation as well as installing operating systems software.

Applicants should have 18 months experience in systems programming in an IBM environment; preference will be given to those with a knowledge of MVS or telecommunications software, with particular reference to performance and tuning of systems.

We offer attractive salaries, negotiable according to experience, backed by benefits associated with a large company.

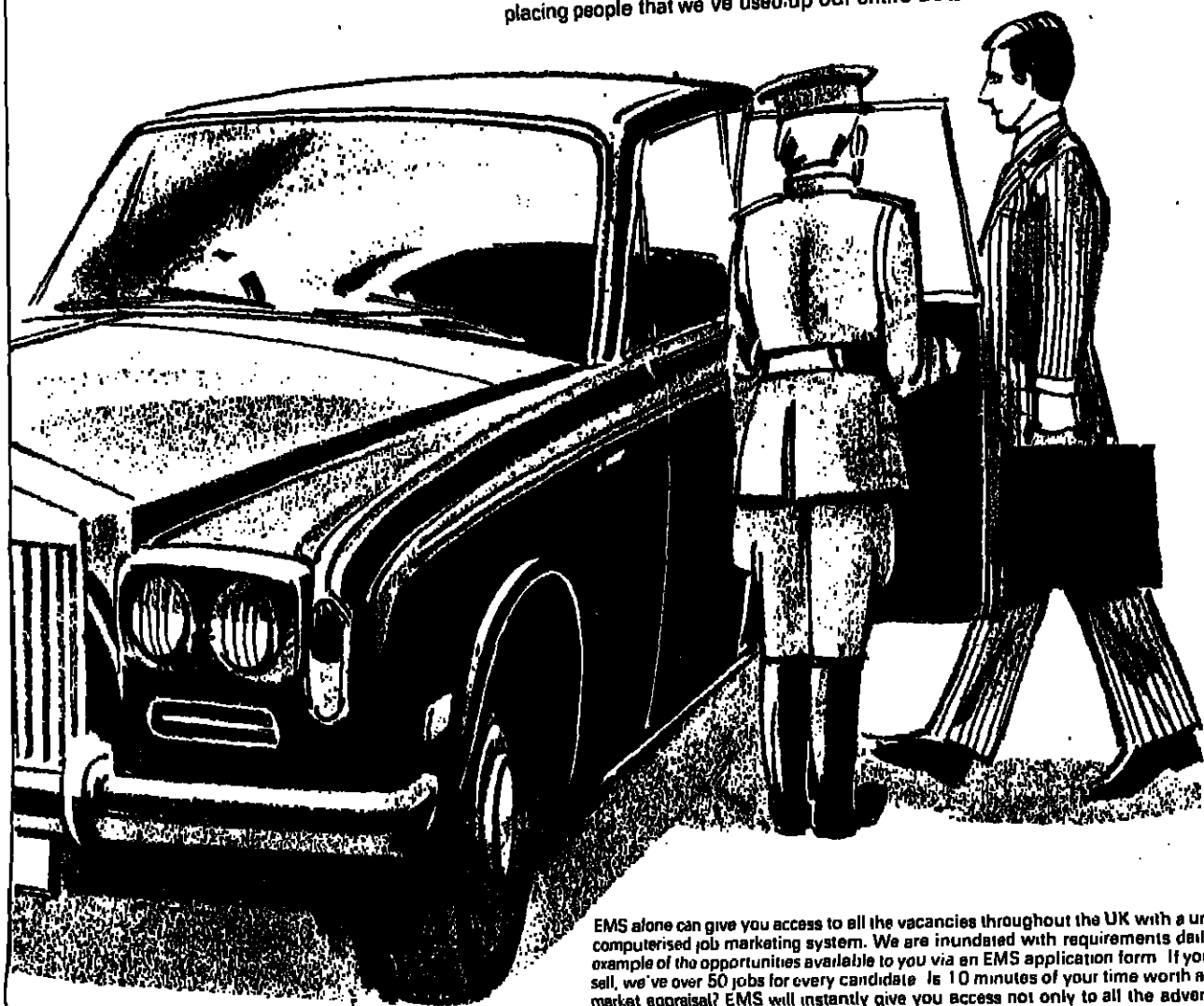
Please send your full details (age, experience, salary, etc.) to: Mrs. V.G. Fairhurst, Personnel Manager Administration, Brooke Bond Oxo Limited, Lion House, High Street, Croydon CR9 1JQ. Telephone: 01-886 8888





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Past experience of Accounting, Distribution, Payroll and general commercial systems is required. Candidates should preferably be educated to a minimum 'A' level standard, whilst preference will be for an HNC/BA or degree.  
Sound career opportunities exist for consultants wishing to transfer later to our Turnkey Division installing mini computer based systems, or to continue with both our national and international consulting division activities.  
For early UK interviewers please phone urgently today for an application form.  
Tony Blane — 021-454 7906  
or John Wood — 0782 623 665

### PACKAGE SYSTEMS DESIGNERS — BIRMINGHAM

**TOP SALARY NEGOTIABLE**  
Our recently opened Data Centre, concentrating primarily on Turnkey Systems Development based on Honeywell Level 8 and D.G. hardware, has ongoing requirements for senior experience Systems Designers with relevant experience, capable of controlling and co-ordinating team development on package design. We particularly seek Systems Designers who have previously worked on the design and development of Packages such as ledgers, Payroll, Sales Order Processing, Stock and Production Systems. All packages will be designed primarily for on-line use to corporate M.S. projects.  
Primary use will be evidence of past statements in this area for each candidate. As large budgets are being committed to achieve a modularised solution, and avoid unnecessary repetitive development in future. Any experience of structured programming would be especially welcome although not necessary. Past experience of working to tight deadlines and motivating a team of 4 to 8 people to commit to achievable targets and to succeed will be important. A sound knowledge of many facilities and operating systems peculiarities will be important. Past experience of working on-line using Cobol will be essential.  
We have a modern, well equipped Data Centre with a wide range of facilities, committed to spreading turnkey software development for a growing and diverse range of manufacturing and distribution systems. The Company operates throughout the entire UK and plans to expand the Data Centre overseas by 1981. We offer a unique development opportunity for a top progressive Mini Project Manager capable of making a major contribution towards both current and future development plans. Significant scope for career progression for candidates of suitable calibre, able to make an early and positive contribution towards group development.  
Reply to Ian Gapper — 021-454 7906

### SYSTEMS DESIGNER ICL 2904 BASED SYSTEMS

**ATTRACTIVE NEGOTIABLE SALARY**  
The EMS/ICL Systems Division based in our Newcastle under Lyme Centre have an urgent requirement for an experienced Systems Designer to work in a small team of analysts and programmers to take responsibility for feasibility studies, systems analysis and design for a variety of projects and regular communication with the client through to systems testing, implementation and user training. This particular Systems Designer has only been established for the last 6 months and will be doubling in turnover each year during the next few years. The client is a leading organisation developing their own in-house systems on behalf of a significant range of users through to systems testing, implementation and user training. We are already well ahead of projected targets and envisage a successful development during the 1980s. Work varies from many original custom-built projects through eventually to converting a variety of established systems from our Mini and Turnkey Development Unit based in Birmingham for use on ICL 2904/4 and coming new range systems. An attractive salary will be negotiated according to the level of experience and ability of each candidate.  
Consultant — Don Whitfield — 0782 623 665

### MINI SYSTEMS DESIGNERS LONDON & HOME COUNTIES

**UP TO £9,000**  
A large range of Mini users throughout the London region have urgent requirements for experienced designers to undertake a wide and diverse range of development projects during early 1980. One of our leading original manufacturers have engaged upon specific product development to market throughout their own client base. Turnkey systems group developing applications systems on behalf of clients, major leading organisations developing their own in-house systems on behalf of a significant range of users through to systems testing, implementation and user training. We are already well ahead of projected targets and envisage a successful development during the 1980s. Work varies from many original custom-built projects through eventually to converting a variety of established systems from our Mini and Turnkey Development Unit based in Birmingham for use on ICL 2904/4 and coming new range systems. An attractive salary will be negotiated according to the level of experience and ability of each candidate.  
Consultant — John Wood — 0782 623 665

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**UP TO £10,000**  
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PDP-11 Assembler and Basic Programmer—London—6 months.  
**NORTHERN**  
Honeywell Level 86 Analysts and Programmers—North-West—1 year.  
Senior Fortran Programmers—Manchester—1 year.  
IBM CICS Analysts and Senior Programmers—Cobol and Assembler—Manchester—1-2 years.  
**MIDLANDS**  
Burroughs Programmer—Cobol—DMS 2—North Midlands.

**EMS**

Phone: 021-454 7906 or

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Tricorn House, Hagley Road  
Fiveways  
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Birmingham

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### IDMS SYSTEMS AND PROGRAMMING

One of our Dutch clients is currently entering a phased development of an on-line Property Registration System which is due for implementation in early 1981 and where the hardware comprises, Siemens 3000 (IBM 370/158 OS MVS compatible) equipment. The flexibility of the project, however, allows for hardware independence therefore, knowledge of a specific hardware system is not essential; more important is a sound background in IDMS Database techniques. For this task we require:

**Systems Analysts, Project Leaders and COBOL Programmer/Analysts.**

The projects are:

**Enquiry Systems  
On-Line Transaction Handling  
Archive Systems  
Report Systems**

No language problems are anticipated but, nevertheless, senior team members will be taught Dutch if necessary. Senior members will also be required to contract for a minimum period of one year.

### SENIOR PROGRAMMER

with INSTRUMENTATION or PROCESS CONTROL experience. Knowledge of RMX 80 multitasking operating system and/or ISIS II advantageous. Hardware INTEL 80/80.

### DATABASE CONSULTANT

to instigate a database structure and reporting system in an IBM 370/158 and 168 environment. A first-class knowledge of IMS Database batch processing for report listing and on-line processing for enquiry handling must be held.

Location: The Netherlands.

### 3790 PROGRAMMERS

to continue development of a distributed processing system and thus good previous experience of 3790 communications processing and macro assembler is essential.

Location: The Netherlands.

### IBM PROGRAMMER/ANALYSTS

to continue development of commercial systems for a multi-national distributed processing group. Familiarity with structured programming techniques and knowledge of IBM 370/138 hardware running under DOS/VS, POWER/GRASP, in a COBOL environment will be looked for, together with a minimum of two years experience. An upgrading to IBM 4300 Series is already in progress.

Location: The Netherlands.

### RPG II PROGRAMMER

to support general commercial systems running on IBM System 34 hardware. These include order processing and financial systems and, although not mandatory, some knowledge of COBOL could well be advantageous. Again, good previous experience will be looking for.

Location: The Netherlands.

### COMPUTER OPERATOR

for night-shift work on an IBM 370/138 running under DOS/VS and POWER/GRASP in an environment also using CICS, VTAM and SNA.

Location: The Netherlands.

### TECHNICAL AUTHORS (HARDWARE)

are required for a number of clients to write handbooks on digital equipment and telecommunications subjects. An ability to write clear, concise English will be looked for.

All the above opportunities carry really first-class remuneration — together with generous concessions already negotiated with the Dutch taxation authorities — plus four weeks paid holiday per annum, paid national holidays and certified sick time, as well as a holiday bonus and the full support of the administrative staffs based in our Dutch offices.

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## DMS 1100 Database Projects

**Designers/Consultants to £22,000**

We currently have a range of opportunities for experienced DMS 1100 database designers in both Holland and Germany. Naturally, a broad systems design background is required for these positions, to include on-line systems design (preferably TIP) and project control or consultancy experience.

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Sound DMS and TIP technical expertise is essential for these openings. In most cases, progression to Analyst/Designer level is available. Opportunities exist in Holland, Belgium, Germany and Denmark.

The salary package and associated benefits largely depend on whether candidates wish to take a fixed-term contract, or join one of our clients on a permanent basis. In the latter case extremely good benefits are available with the possibility of a company car, full relocation etc.

For more details and an exploratory chat... **Contact: Andy Wright**

## Project Leader

**Brussels to £18,000 + car**

A mature and experienced Systems professional is required to head up a development project currently getting under way for a large bank in Brussels. The system to be developed is going to be database orientated, so applicants must have had significant exposure to database/L.P. systems development. In the first instance, the appointee will help the company decide which db product to use and how the project should be developed.

Excellent opportunity, with good career prospects for the right individual.

**Contact: Andy Wright**

## Principal Systems Analyst

**Cheshire c. £8,000 + mortgage sub. & other benefits**

The computer division of a well-known banking group require an experienced Systems Analyst for widely varying work. This encompasses feasibility and management studies, software/hardware evaluation, package installation and research projects.

Suitable applicants will have at least six years experience, including programming, systems design and implementation particularly of real-time or communications based systems. Knowledge of OR, ODM or work study or banking systems would be an added bonus.

Benefits include mortgage subsidy, non-contributory pension scheme, free BUPA, relocation, etc.

**Contact: Mike Creamer**

## Programmers

**Turnkey Project Development**

**London £6,000 - £8,000**

One of the longest established British systems houses has built a substantial group within the company which specialises in minicomputer turnkey systems. Since their client base has doubled in 12 months, the need for experienced technical personnel is growing. Specific experience required is essentially on PDP minis, with sound knowledge of BASIC +, BASIC + 2, FORTRAN or COBOL programming. Candidates must have the potential to reach Senior Technical Consultancy and/or Management positions in 5 years time.

These are highly paid career opportunities within a company whose reputation relies on the quality of its personnel.

**Contact: Margaret Stevens**

## Development Programmer

**For First-Time Mini User.**

**Surrey c. £7,000 + bonus**

A well established commercial organisation wishes to recruit an Analyst/Programmer to assist with the design and development of their first minicomputer systems.

Candidates should have at least three years experience of high level languages in the development of accounting/financial/stock applications. This is a unique opportunity to be the first member of the d.p. function.

**Contact: Jim Baker**

## Systems Consultants

**Manchester c. £6,000 + car**

A well-known peripheral manufacturer requires a SYSTEMS CONSULTANT to work in the North West Area. Interesting duties include SALES and TECHNICAL SUPPORT for an advanced range of peripherals, serving mainframe hardware. Applicants should have a good commercial computing background including periods in both systems and programming.

**Contact: Bev Stevens**

## Programmers and Analysts

**Salaries Neg.**

This company is world-renowned in the development and marketing of Database and TP software. Their Consultancy Division, which is expanding rapidly, have a requirement for good quality Analysts and Programmers to work on a variety of commercial projects. Flexibility and professionalism are more important than specific hardware/software experience, but commercial systems experience is required.

**Contact: Bernard Kierman**

**JAMES BAKER ASSOCIATES,  
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Data Communications is the big expansion area of the Eighties. Our client led the way in the last decade, and plans to stay in that position for the next.

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Computer Executives**



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Computer Centre  
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IN COMPUTER STUDIES

Applications are invited for two additional lecturing posts within the Academic Division of the Computer Centre.

Applicants should be graduates and should possess either a higher degree in computing or several years' practical experience of computer application.

SALARY SCALE: Lecturer II: £4470-£7149; Senior Lecturer: £6597-£7701 (plus £8263).

Further details and application forms (to be returned by 6th March, 1980) from: The Personnel Officer, City of Birmingham Polytechnic, Perry Barr, Birmingham B42 2BU. (021-358 6911, Ext. 217).

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Box number replies should be addressed to:

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### Sex Discrimination Act

No job advertisement which can reasonably be understood as indicating an intention to discriminate on grounds of sex (e.g. by inviting applications only from males or females) may be accepted under the Act.

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- (2) it is in a business employing six persons or
- (3) it is otherwise exempt from the requirements of the Act.

A statement must be made if an advertisement is placed in breach of the exceptions in the Act. It must be applied to the

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Company car or Allowance

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Our client is the well known Business Computer and Data Processing Division of an INTERNATIONAL GROUP OF COMPANIES operating in high technology areas throughout the world.

THE DIVISION IS  
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**EXPANDING -**  
50% ANNUAL GROWTH IN  
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THE UK**

They are part of a UK company which has a turnover in excess of £650M and employs over 40,000 people.

Their products are well known and established in the fields of Business Computers and Distributed Data Processing with Multi-Tasking Software and Word Processing capability.

Their commitment to the UK is total and in order to maintain their growth rate they are offering tremendous opportunities to experienced Sales Executives throughout the UK.

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- \* Generous Basic Salary
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# ... CONTRACTS... CONTRACTS... CONTRACTS...

## A practical approach to selling your skills

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Thankfully the days will soon be over when the mediocre operator, programmer or analyst can find his niche in contracting, because the customer is looking for a person who can do a specific job, efficiently, reliably and to a high standard with the required documentation.

Also, time is running out for the mediocre agency which is more worried about volume than quality. Even though there is a shortage of 20,000 to 30,000 people in the industry, the standards of contractors have to be maintained.

Just consider, for a moment, this point. Generally speaking most contractors

buy off-the-shelf/limited companies to gain the advantages of Schedule D. By trading as a limited company the contractor, basically a technician, also becomes a businessman, but one who has only his own technical skills to sell. He can only remain in business by keeping his techniques up to date, maintaining a businesslike attitude to the service he provides, and keeping his most valuable asset, his reputation, in prime condition.

So when considering a career in contracting, what background do you require and what sort of attitude do you need to adopt?

Firstly the attitude you need to adopt — and this must seem obvious but is worth reiterating — is a thoroughly businesslike and confident stance. Another point to emphasise for the first-time contractor is the importance of the first contract. It is not often realised that this is his make-or-break job in the world of contracting,

because here he starts on the ladder and gains the opportunity of building that all-important asset, his reputation. All contractors must bear in mind that DP is a very small world and a bad reputation is transmitted frighteningly fast.

The other main point is the gaining of experience, which can be thought of as an apprenticeship. The customer in a contract situation is only buying what you have got. So a solid background in computing is required, generally speaking some four or five years' knowledge gained in one or two installations on possibly a number of machines (mainframe and minis ideally) and several different languages (or operating systems in the case of operators) — all adding to your armoury of knowledge to offer a potential client.

Once this has been gained and the contractor feels ready to accept the risks and challenge of freelancing, then he puts himself at the mercy of an agent.

But before we look at the role of the agency, a word about the risks involved in freelancing. The one aspect most people are conscious of is the continuity of work.

This problem can be eased by using a reliable and reputable agency, because this is its job. Remember, an agency is not making any money while a contractor is not working, so therefore the agency should be looking after your interests while looking after its own.

It is also worthwhile taking a brief look at why people require freelance staff. There are three main reasons:

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Coming back to the attitude of the freelance — as he is both a technician and a businessman but enjoys most of all the technical challenge involved in his career, a different attitude is required of him from that of permanent staff. A contractor cannot be involved in any way with company politics. Contractors are highly paid to do a particular job and that is all that is expected of them.

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Europe, especially the Benelux countries, is another stamping ground for our eagerly sought after DP

by Phil Waller

The contracts manager Manchester-based agency Victoria Appointments assesses the risks and advantages involved in freelancing, and the role the contractor needs to bring to this form of work.

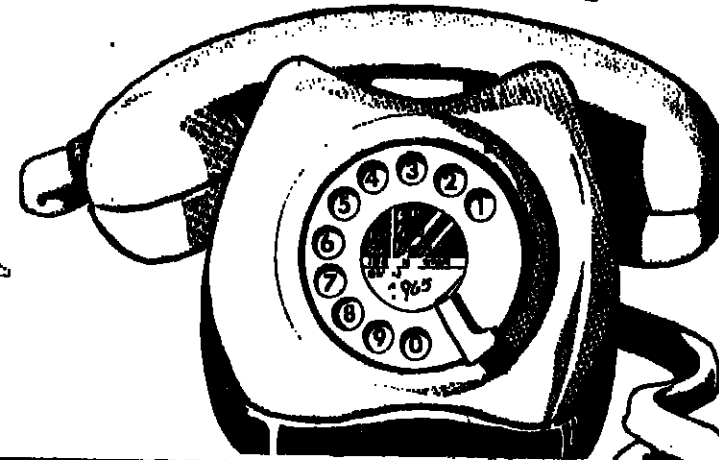


## CONTRACTS

# PICK OF THE BEST PAID JOBS AROUND FROM KNIGHT PROGRAMMING

Phone these numbers to learn about even more big paying contract jobs in the North and Midlands

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## A phone call could double your earnings

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This really is the pick of the best. If you have REALTIME D.B. SYSTEM experience, a major concern based within easy reach of several commercial centres, needs you and wants to tempt you with some really handsome cash. The contract is for three months starting in April and you'd be working on up to date financial applications. Phone us now and we'll arrange to get the big money coming your way.

##### £300 per week Midlands

This certainly is a good week for Programmers. Earn way above average! A major complex needs your 4-5 years DP experience and communications and software background to put to use on PDP11, RSX11M, RTL2. There's a three month contract which is renewable and you can start March/April. You'd be working in the Programming and Systems Section. So if that appeals (and with money like that how could it fail) phone us now.

##### £250 per week North West

In the exciting heart of the North West you could be earning a little gold mine! Starting March there's a company crying out for your CICS on-line and TOTAL DATABASES experience to use on IBM 370/148 DOS VS ASSEMBLER. The contract is for 3-6 months and you'd be working on commercial applications. So if you're in a rut and think you're worth £250 per week (and who doesn't?) phone us now.

IBM CICS DLI £280 p.w. 6-12 months Yorks  
UNIVAC 1100 £280 p.w. 4 months N.W.  
SYSTEM 10 £270 p.w. 12 months Mids.  
ICL 2904 £260 p.w. 12 months N.E.  
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Here's your chance to live and work the good life. Within easy reach of the idyllic Lake District and North Wales there's a growing company wanting your knowledge of IBM 370/OS/COBOL, CICS and DLI. Work involves programming from specifications, test and document work within an enthusiastic team on a continuous project. It's a 6 month contract starting now. So pick up the phone and tell us about yourself. Do it today.

##### £260 per week Midlands

This job offers you some of the best countryside in Britain. Knowledge of IBM 370/158 OS/COBOL, IMS & DLI plus a COPIES PACKAGE is your passport to working on a conversion project. You'd be getting in at the beginning of a major change and that's got to be good for you. It's a 3 month contract starting now and the facilities here, including sports, are truly luxurious. Phone us now for this peach of an opportunity.

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IBM PLI £270 p.w. 3 mths Mids.  
PDP11 DIBOL £280 p.w. 3 mths Mids.  
ICL 1500 VTL/CDB £280 p.w. 3 mths Scotland  
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### Analyst Programmers

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##### Project Leader £300 per week Central Wales

5 years' D.P. experience in a commercial environment together with UNIVAC 1100 and INTERACTIVE SYSTEM DESIGN experience makes you right for this very responsible position within a major enterprise. Initial three month contract is available starting whenever you're ready. It's a prime job in a top company in a comfortable setting. Phone us now for full details.

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Project Leader PDP 11 £300 p.w. N.W.  
Systems Designer Fortran £300 p.w. N.W.  
Senior Analyst HP3000 £280 p.w. N.W.  
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1. Absolute confidence guaranteed.
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7 SKELMERDALE	10 Programmers	IBM	5-7 yrs. Systems Design	c. £5,500 + Mortgage
8 MANCHESTER	2 Business Systems Analysts	IBM 370	Min. 12 mths Commercial COBOL/ASSEMBLER	£7,000
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16 SHEFFIELD	Technical Support Prog	H. 64	12 mths. S.A. exp.	c. £8,000
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18 HULL	Systems Analyst	UNIVAC	Communications exp. Strong Systems Analysis	£8,500-£8,700 + CAR
19 SHEFFIELD	Analyst Prog. Prog	ICL/2904, 1900	UNIVAC Commercial on-line COBOL	£8,750
20 MANCHESTER	2 Sen. Prog. / Analysts	IBM 370	2-3 yrs. COBOL	£5,000-£8,000
21 LIVERPOOL	Programmers	IBM 370	IBM 370, 1-3 yrs. COBOL CICS VS	up to £7,000
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23 NORTH OF ENGLAND	Senior Programmer	ICL 2904	3-4 yrs. COBOL Varied Commercial	c. £8,000
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#### OTHER REQUIREMENTS

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Several contracts are available in Scotland, with start over 3-6 months.

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Reg. No. NW 389

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Computer Centre  
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**ab executive**

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KT1 1BW. Telephone: 01-549 6441.

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Europe, especially the Benelux countries, is another stamping ground for our eagerly sought after DP

experts. The main advantage here is the EEC — to work permits, and the language, because many Europeans can speak English alarmingly well.

The only word of warning here is to watch the cost of living out there (especially for accommodation) but on the other hand, remember you are on the mainland of Europe so the sun is only a reasonable drive away.

An agency is an important part of your career. A contractor is very quickly able to sort the wheat from the chaff and should deal with only those agencies he feels comfortable with.

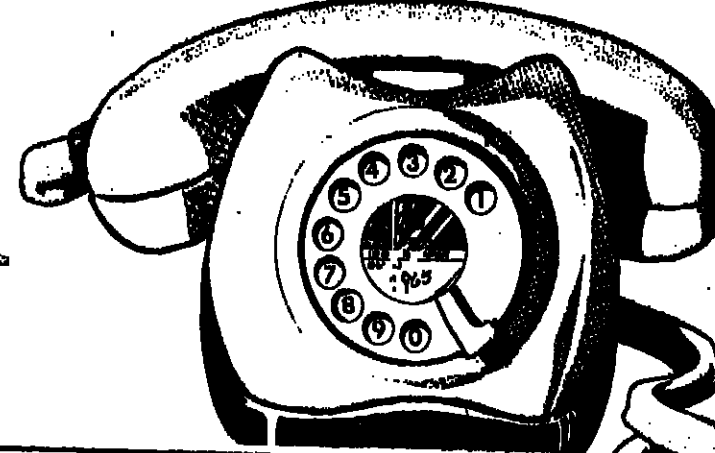
Finally, contracting can give a satisfying, rewarding and sometimes exciting career with opportunities to work in different parts of this country and abroad. If this type of career appeals to you, pick up your pen and coding pad and get contracting, remembering to guard jealously your most valuable asset, your reputation.

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This small friendly installation require an additional ICL COBOL programmer, to work on commercial applications on 2900 hardware. Two years' ICL experience essential.

### MERSEYSIDE COBOL PROGRAMMERS £8,000

Our client is upgrading to 2905 hardware, and offer real prospects and opportunity to two young programmers with a minimum one year's ICL background.

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Myriad 154



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## SYSTEMS AND PROGRAMMING

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Ref: IM 8/1

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Ref: IM 8/2

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Ref: IM 8/3

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Ref: DB 8/6

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# MERSEYSIDE

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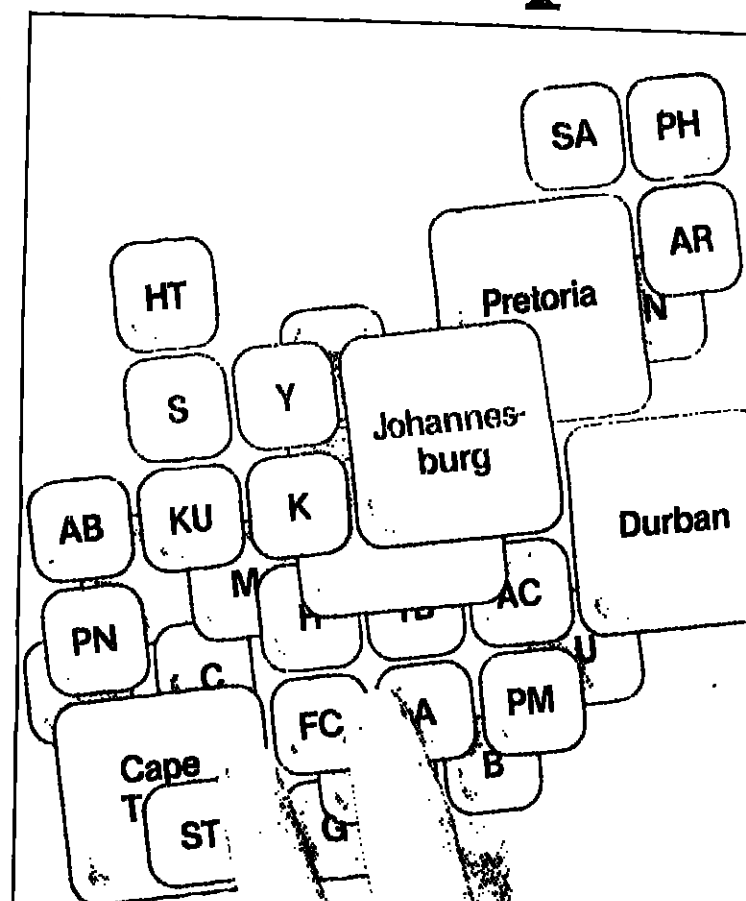
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**IBM**  
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DOS COBOL Programmers  
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## CHIEF PROGRAMMER

Applications are invited from persons with a good knowledge of OS 1100 COBOL systems and experience at a senior level for the post of Chief Programmer on the staff of the Treasury. A working knowledge of TIP/DMS would be an advantage. The Government currently operates a Unisys 90/30 which is to be replaced by an 1100/80 Model C1 later this year. The successful applicant will be expected to assist with the conversion and to subsequently contribute to the development of the Government's computer systems. The post is permanent and pensionable on a non-contributory basis (save for a contribution of 1% towards family benefits) and has a salary scale of £5,700-£8,575 per annum. A removal expense grant of 60% is payable and the standard rate of income tax in the island is 20%. Further details of the post can be obtained from the Data Processing Manager at the Treasury. Applications stating full name, date of birth, address, qualifications and experience, should be submitted, together with the names and addresses of two referees, to the Secretary, Civil Service Commission, Government Offices, Douglas, by 7th March, 1980.

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£4881-£6304 West Ewell

For the County Engineer's Transportation Planning Unit at Highway House, 21 Chesham Road, West Ewell, Epsom, Surrey. Tel: 01-394 1748. Closing date: 21 March 1980.

Application form from County Engineer (please quote ref. 28)  
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If you'd like to find out more contact Keith Malpass at Marconi Space & Defence Systems Ltd., Nelson Industrial Estate, West Avenue, Kidsgrove, North Staffs. Tel: Kidsgrove (07816) 3501 Ext. 2008/9.

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## THE SALES BIT

### Why avoid the managing director?

FEW salesmen, particularly in capital goods selling, have not been exposed to the proposition that to make one's initial sales contact at the managing director level has a significant number of benefits, including greatly improved chances of actually winning the order; yet a significant proportion of salesmen, having acknowledged the inherent wisdom of the statement, proceed merely to pay it lip-service.

Why do they do it? Why are salesmen so reluctant to apply this piece of obvious commonsense? What is their reason for avoiding the one person who has the real authority to say yes?

The answer is simple: conscious or subconscious fear and inadequacy!

I know that sounds a bit strong, but it's absolutely true. I suppose you could say it is laziness, or lack of intelligence, or the deliberate choice of an easier option that makes salesmen attempt to sell their products "down-the-line", but you would be wrong!

The average citizen is brought up to feel inadequate in the context of his or her heritage and environment. Against a historical backdrop of Kings and Queens and the autocratic power of church and State, the average kid is systematically exposed to authority of its parents, schools, church, police, military, and government; augmented by the humiliation of high technology and, today, the nuclear holocaust. In such circumstances there is every reason why the subconscious of the average citizen is attuned to inadequacy and fear of authority, despite possible protestations of the conscious mind to the contrary.

Clearly this mantle of inadequacy is an illusion, but it still needs an enormous effort to throw it off. The first stage in overcoming a reluctance to approach managing directors is to try and understand who and what they really are. The fact is they are typically quite ordinary people who, like all of us, find themselves much the same person, from the inside looking out, as they were as a child. They feel just as vulnerable and aware of their mortality as anyone else, and their position of relative power comes not only as a daily surprise but as a possibly less job security than they

possessed at lower stages of their career.

Managing directors lose their jobs, have marriage crises, and worry about their health like anyone else.

My first sales manager always recommended the "Emperor's new clothes" routine to young salesmen in particular who were nervous about approaching and meeting very senior clients. "The silly sod is going around in the nude!" he used to say. "He's sitting there behind his desk starkers and only you have had the perception to recognise the fact!" It always worked rather well. I wonder how many senior executives in the West Riding of Yorkshire really know what my source of confidence and enthusiasm was really about?

But I digress. A managing director is just a guy doing a job. Okay, there are a few arrogant megalomaniacs around but I venture to suggest you will come across more of these in middle management than at the top. Managing directors are usually very busy men, involved in meetings most days of their lives. For this reason one usually has to plan well ahead and make a professional approach to them. First appointment in which is sensitive to his activity and responsibility; but after all, that's not so different from getting to see most other people.

More next week.

TRADER

Trader welcomes comments on his column and is happy to consider readers' problems in marketing and selling.

## Cutting and polishing

A REFERENCE book on cutting and polishing electro-optic material is available from Metals Research, Crawley £25, the 200-page book, written by G. W. Fynn and W. J. A. Powell of the Royal Signals and Radar Establishment, Malvern, is likely to remain the standard reference book on the subject for years to come.

The authors have been involved for 18 years in the production of optical and electronic components as well as in the training of technicians in this field. Their book embodies the knowledge gained from overcoming problems of fabricating new crystalline materials for solid state devices. Copies may be had from the company at Melbourn, Royston, Herts.

## Puzzle Answer

### Guide

An information package complete with applications and case histories of its ATE systems is available from Fluor Automated Systems. The package includes application notes and details on how the 3000AL logic board tester has solved testing problems on 8080, 8085, 8088 and 280 microprocessors based boards as well as descriptions of all Fluor ATE products. This package is available from Fluor Automated Systems, 22 Southgate Road, Welling, Kent DA2 2JF.

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David Levine, Vice President, AGS Computers, Inc., 1135 Spruce Drive, Mountaineer, N.J. USA 07092. All C.V.s received will be answered. Interviews will be held in March and April. U.S. Offices: New Jersey, New York, Connecticut, Massachusetts, Colorado, Indiana.

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Experience of an ICL 2903 would be an advantage. Application forms and further details are available from the

Divisional Personnel Officer,  
Severn Trent Water Authority,  
Lower Severn Division, South-  
wick Park, Gloucester Road,  
Tewkesbury, Glos. GL20 7DG.  
Telephone: Tewkesbury  
284516.  
Closing date: 6 March, 1980.



## THANET JOINT COMPUTER COMMITTEE DEPUTY COMPUTER MANAGER

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The person appointed will be expected to have formal systems training and to hold a degree of Level 4 and be a significant addition to the substantial systems changes required by the constituent authorities.

Benefits include 28 days' leave, contributory pension scheme and flexible working hours with relocation expenses and assistance with housing where necessary.

For a job description and application form write to the Computer Manager, Thanet Computer Centre, Helne Road, Ramsgate, Kent CT12 5AA or telephone Peter Brown on Thanet (0843) 81742. Applications to be received by March 12, 1980. Interview date March 20, 1980.

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For further details ring Chris Carter, Computer Operations Manager, on 01-226 1234, Ext. 216 or 218, or write to the Director of Finance, London Borough of Islington, Town Hall, Upper Street, London N1 2UD, quoting reference F227. Closing date March 7th, 1980.

Our jobs are open to all races and both sexes

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